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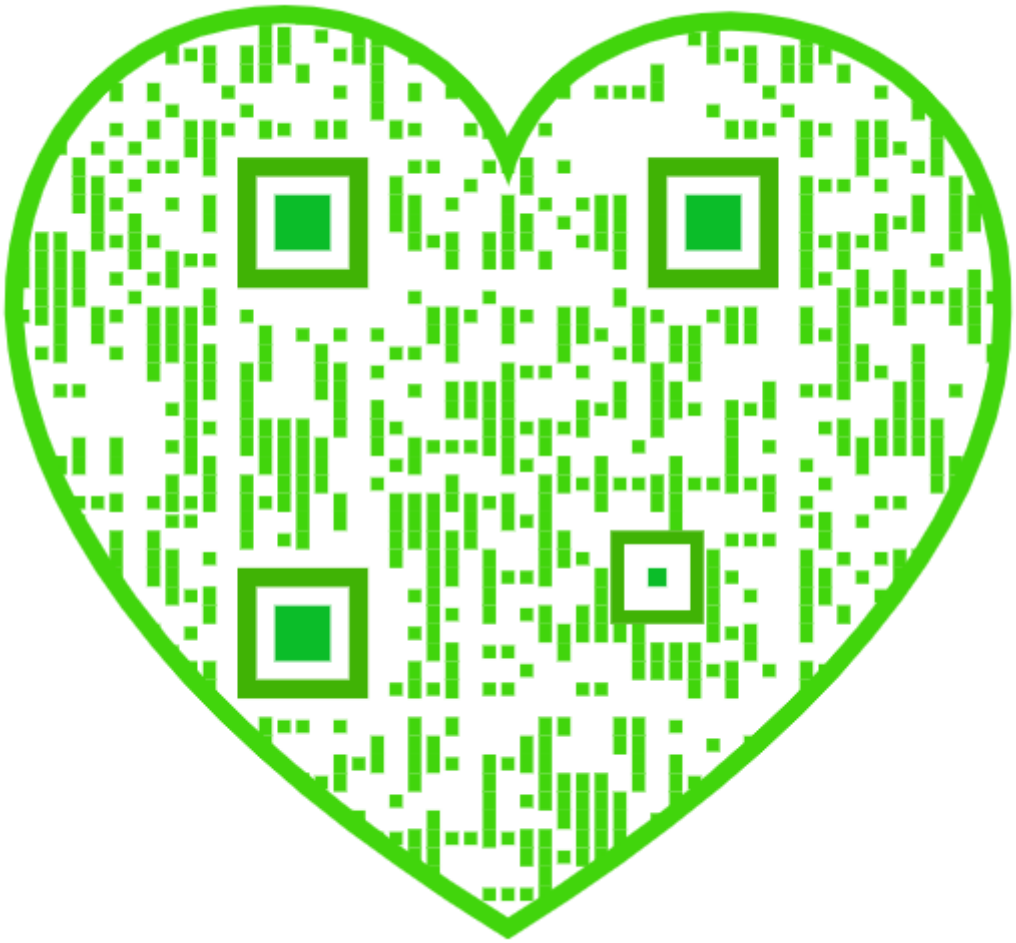

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STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 320

Contribution from the Bureau of Plant Industry
WM. A. TAYLOR, Chief

Washington, D. C. ▼ January 24, 1916

FARM PRACTICE IN THE CULTIVATION OF CORN

By

H. R. CATES, Scientific Assistant
Office of Farm Management

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By H. R. Cates, *Scientific Assistant, Office of Farm Management.*[1]

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INTRODUCTION.

The subject of tillage is one upon which much fundamental information is yet to be supplied. Numerous tillage experiments have been conducted by various agricultural experiment stations, but a compilation of the results of these experiments shows that no general conclusions can be drawn from them; in fact, the results in different States seriously conflict. This is probably due to the fact that the experiments have been conducted upon different types of soil and under other widely varying conditions, as well as to the fact that in many cases experiments have not been repeated a sufficient number of times to justify conclusions, even locally. Further, the experiments have usually been designed to find out the most productive practices, whereas the farmer is interested in the most profitable practice.

Previous studies, reported in Bulletin 257 of the Bureau of Plant Industry,[2] have shown that the principal object of intertillage in

[1] The Office of Farm Management was transferred from the Bureau of Plant Industry to the Office of the Secretary on July 1, 1915. The work upon which this paper is based was done and the manuscript was submitted and its publication arranged before the transfer took place.

[2] Cates, J. S., and Cox, H. R. The weed factor in the cultivation of corn. U. S. Dept. Agr., Bur. Plant Indus. Bul. 257, 35 p., 10 fig. 1912.

Note.—This bulletin gives the results of an extensive study of cultural practice with corn and should be of interest to farmers in all regions where corn is grown.

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growing a crop of corn is the elimination of weeds, but these studies gave no information as to the reason for the great variation in tillage practices prevailing in the different sections of the country. It was quite natural, therefore, that the work originally undertaken should lead to a study of these variations in local practices, with a view to ascertaining the fundamental causes of existing differences, and of determining whether these differences were due merely to difference in the weeds which must be combated or to difference in economic conditions in the various agricultural sections of the country.

The fact that the local practice in the preparation of the seed bed for corn varies as widely as do the local practices with reference to intertillage itself suggested that the differences in methods of intertillage were due not merely to differences in the weed population. It was therefore decided to extend the study so as to include local practices in the various agricultural regions having to do with the preparation of the seed bed, as well as the intertillage of the corn crop. It was recognized that on the average the farmers in the different agricultural areas had worked out methods of tillage which were at least fairly satisfactory under their conditions, and it was therefore believed that a study of these various methods which have proved profitable through long experience in various localities, and studies of the conditions under which they prevailed, might lead to the discovery of the factors which control differences in local practice. As will be seen in the following pages, this expectation was fully realized.

These studies were made in selected regions (fig. 1) which include in a general way all important corn-growing sections of the country. In selecting these regions it was the aim to choose those having conditions and methods which are representative of large areas. The studies herein set forth, therefore, give the reader a broad, general idea of the tillage methods actually employed in corn growing. Incidentally, the yields related thereto are also given.

In all, 21 regions were covered. About 25 representative farms were studied in each region. A record was taken from each farmer visited, showing in detail his tillage practices with corn and also the general practices and conditions on his farm. The detailed results of these studies are presented in tabular form. The general information is first presented and then the tillage data.

The records for each region were tabulated and the averages as presented in Tables I and II will give the reader a good general idea of farming conditions in the regions under discussion. Other tables are presented which relate to plowing, planting, subsoiling, and miscellaneous tillage operations.

A table relating entirely to tillage is given for each section. This table shows in detail the tillage operations for corn after plowing

and before planting, and also gives in detail the tillage operations after planting. In addition to these tables a description is given of each section studied, discussing the general conditions and customs found there.

It is not improbable that tillage methods found in some sections of the country could, to a greater or less extent, be profitably employed in other sections. In this publication, however, we are concerned merely with setting forth the findings on actual tillage methods employed by representative corn growers in the areas studied, and no attempt has been made to make recommendations based on the results of these studies.

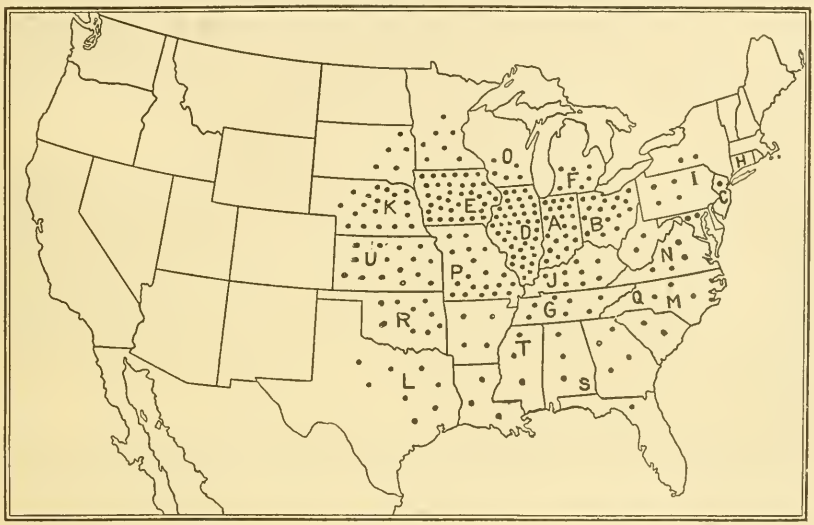

FIG. 1.—Outline map of the United States, showing the distribution of corn production by States, each small black dot representing a yield of 10,000,000 bushels (census of 1910). The counties and States in which the regional corn-tillage surveys were made are indicated by key letters showing locations, as follows: A=Tipton, Ind.; B=Montgomery, Ohio; C=Mercer, N. J.; D=Moultrie, Ill.; E=Tama, Iowa; F=Kalamazoo, Mich.; G=Maury, Tenn.; H=Hartford, Conn.; I=Bradford, Pa.; J=Christian, Ky.; K=Hamilton, Nebr.; L=Rockwall and Grayson, Tex.; M=Scotland, N. C.; N=Augusta, Va.; O=Waushara, Wis.; P=Bates, Mo.; Q=Alexander, N. C.; R=Oklahoma, Okla.; S=Pike, Ala.; T=Holmes, Miss.; U=Russell, Kans.

The illustrations in this bulletin are given simply as types of machines and are not designed to show any particular make. There are many machines on the market which may be utilized with perfectly satisfactory results for the various farm operations illustrated and described.

GENERAL STATEMENT.

The subject of tillage of corn can properly be divided into two parts. The first has to do with the preparation of the seed bed, and the second with the cultivation of the growing crop. Both in the preparation of the seed bed and in intertillage the prevailing con-

ditions with reference to farm labor and farm capital are the principal factors in determining differences in practice. In the preparation of the seed bed the soil type is also an important factor, while in intertillage the types of weeds to be dealt with have much to do with prevailing practices. The reason why greater variation in results is not shown for the different methods and amounts of intertillage is that, in the main, all the practices studied were adequate for weed control in the growing crop in the regions where these practices are employed. (Table I.)

Previous investigations have shown that if weeds are eliminated, any sort of intertillage becomes of minor consideration.[1] The whole subject, therefore, is far more largely of economic than of agronomic importance. What the farmer wants to know concerning seed-bed preparation is: What is the cheapest method of making an adequate seed bed under his conditions? An adequate seed bed may be defined as land free from weeds and surface trash, sufficiently mellow to permit easy penetration of the plant roots, sufficiently compact to hold moisture and to be free from large air spaces, and sufficiently fine in texture to bring many soil particles in contact with the seed and thus to supply an abundance of moisture to the germinating plant. Land so prepared is also in good condition for subsequent tillage. What he wants to know concerning intertillage is: What is the cheapest method of controlling weeds which infest his growing crops?

TABLE I.—*Summary of tillage practices with corn, showing the averages of depth of plowing, number of cultivations, price of land, commercial fertilizer used, and normal yields per acre in twenty-one regions of the United States.*

Region covered (fig. 1).		Depth of plowing.	Workings after plowing and before planting.	Cultivations after planting.	Price of land per acre.	Commercial fertilizer used.		Normal yield.
Key letter.	County and State.					Farms applying.	Applied per acre.	
		Inches.				*Per cent.*	*Pounds.*	*Bushels.*
A	Tipton, Ind.	6.7	2.8	5.5	$209.48	3.4	200.0	57.4
B	Montgomery, Ohio.	7.1	3.6	4.0	146.96	31.0	217.2	52.3
C	Mercer, N. J.	6.3	3.5	5.9	101.87	78.1	331.7	51.1
D	Moultrie, Ill.	5.4	3.2	4.4	198.30	0	.....	49.5
E	Tama, Iowa.	5.1	3.0	5.3	196.40	0	.....	46.6
F	Kalamazoo, Mich.	6.7	3.3	5.0	101.40	0	.....	41.5
G	Maury, Tenn.	7.7	2.7	5.4	110.38	0	.....	40.9
H	Hartford, Conn.	7.4	2.4	3.8	138.80	88.0	727.3	39.9
I	Bradford, Pa.	6.1	2.5	4.4	51.20	28.6	178.1	38.2
J	Christian, Ky.	7.1	3.0	5.1	69.04	3.8	125.0	36.9
K	Hamilton, Nebr.	5.8	2.5	5.1	158.38	0	.....	35.0
L	Rockwall and Grayson, Tex.	6.4	1.5	3.9	103.41	0	.....	33.6
M	Scotland, N. C.	7.0	2.3	4.3	113.50	100	575.7	33.0
N	Augusta, Va.	8.0	3.0	4.1	71.80	42.9	161.3	33.0
O	Waushara, Wis.	5.5	1.8	5.4	48.27	0	.....	30.4
P	Bates, Mo.	5.9	2.3	4.8	95.00	0	.....	29.3
Q	Alexander, N. C.	6.0	1.1	5.1	39.14	78.9	128.1	25.2
R	Oklahoma, Okla.	5.6	1.5	3.9	50.00	0	.....	23.9
S	Pike, Ala.	6.7	.6	4.7	36.50	90.5	366.8	23.1
T	Holmes, Miss.	5.1	1.4	4.7	22.40	4.0	200.0	22.0
U	Russell, Kans.	5.5	0	3.8	43.20	0	.....	20.4

[1] See Bureau of Plant Industry Bulletin No. 257, already mentioned.

For the reasons above stated this bulletin should not be expected to embody a so-called best method of conducting tillage operations everywhere applicable to corn growing. Such detailed information as is here presented amounts, as it were, to taking the reader on a tour of study to visit not only his neighboring corn-raising farmers, but representative corn growers in all the important corn-producing regions of the United States. On such a trip one would expect to get ideas and suggestions to be brought home and tried out. It would be unsafe to recommend for general adoption in any corn-growing region practices which have never been tested there, however successful such practices may have proved in other sections, but in many cases it would be highly desirable for a farmer to try methods which have elsewhere proved successful. These studies, then, should be of great suggestive value to both experimenters and practical farmers.

GROUPS OF CORN-GROWING AREAS.

The regions in which surveys were made may be grouped into five divisions, as follows: (1) The central western, (2) the southeastern, (3) the south central, (4) the southwestern, and (5) the northeastern. In each of these divisions more or less distinct methods and practices are employed.

The first division includes the corn belt proper. Here the tillage practices are very uniform. The land is level or gently rolling. Heavy teams are employed for breaking and preparing the land; gang plows, 2-horse checkrow planters, and 2-horse 6-shovel cultivators are generally used. Corn is usually planted level and in checks.

In the southeastern division, including in the main the cotton belt, a radically different type of tillage is practiced. Here mostly 1-horse implements are employed. Corn is usually planted in the water furrow between beds or in rows laid off with a lister, or middle buster. In cultivating, 1-horse turning plows, cotton sweeps, and 1-horse cultivators are largely employed. The furrow in which the corn is planted is gradually filled up by cultivating until the field is practically level at the last cultivation.

The south-central division, composed of Tennessee, Kentucky, and western North Carolina, is located between the corn and cotton belts and has tillage methods which combine practices from both regions. Here little uniformity is found.

The southwestern division, which includes northern Texas, Oklahoma, and western Kansas, constitutes a comparatively new agricultural region with tillage methods peculiar to that section. Most of the corn is listed, as is the case in all the Southern States, but here heavy teams are employed. The land is bedded with 3-horse or 4-horse listers, accomplishing the same result with one furrow as the

1-horse plows of the South Atlantic States do with four or six furrows. A combined lister and planter is often used, which breaks the land and plants the corn all at one operation. Where this implement is used, often no other preparation is given the land before the corn is planted.

In the northeastern division corn is a minor crop and the tillage methods employed are those which are best suited to the principal crops grown in the region. In the New Jersey area the principal crop is potatoes, and in this region corn is cultivated with the same implements which are used for the potato crop. In Connecticut, where tobacco is the leading crop, the tillage methods for corn are those best suited for cultivating tobacco.

TILLAGE GENERALIZATIONS.

Subsoiling is not extensively practiced and is usually employed only in regions having soils low in organic matter.

The depth of breaking land is governed largely by the type of soil and time of plowing. Sandy or loamy soils, unless underlain with a stiff subsoil, are usually plowed deeper than the heavy clay soils. When land is plowed in the fall it is usually broken deeper than when plowed in the spring.

Listing is extensively practiced in those regions where hot, dry weather prevails during the growing season.

Whether corn is planted in checks or drills depends largely on the extent to which corn is grown, on the size and shape of the fields, and on the topography of the land. Where the land is level and corn is extensively grown it is usually planted in checks, unless listing is practiced. Where corn is not extensively grown and where consequently the fields are small, or where the land is rolling, drill planting is practiced.

The thickness of planting corn varies with the fertility of the soil. It is planted thickest on the most productive soils.

On the most productive farms slightly more cultivation is given corn, both before and after planting, than on the less fertile soils. With tillage after plowing and before planting, the increased work for the higher yielding regions is significant. For instance, for the 10 best regions (Table II) the average number of cultivations after plowing and before planting is 3, while for the 10 poorest regions the average is only 1.6. This, however, may be due to the fact that the character of the heavy clay soils of the Central West, the region where high normal yields most often occur, is such as to require more preparation than the lighter soils of other regions. Further, it may be that with the more fertile soils the increased yield in response to extra good preparation fully warrants such expenditure of labor. With the inherently poorer soils this may not be the case. To illustrate this point, we might assume that a certain percentage

of increase is caused in all cases by this extra preparation. Suppose we place this increase at 10 per cent. Soils yielding normally 60 bushels per acre would then be increased 6 bushels by such extra work. With soils, however, having a normal yield of only 20 bushels per acre the increase for the same amount of work would be but 2 bushels. This latter amount might be too small to warrant such practice.

TABLE II.—*Corn culture in the United States, showing farm practice acreages summarized by divisions.*

Regions covered (fig. 1).	Area of farms.		Per acre.		Fall plowing.		Spring plowing.		Fall and spring plowing.		
	Total.	Cultivated.	Price of land.	Normal yield.	Farmers practicing.	Depth.	Farmers practicing.	Depth.	Farmers practicing.	Depth.	
										Fall.	Spring.
Ten regions:	*Acres.*	*Acres.*		*Bushels.*	*P. ct.*	*In.*	*P. ct.*	*In.*	*P. ct.*	*In.*	*In.*
Best	189.1	154.4	$132.38	45.4	24.0	6.6	73.8	6.4	2.1	8.2	6.0
Poorest	294.6	179.4	62.32	27.4	17.2	7.0	72.6	5.7	10.2	7.8	4.8
Average of all	242.7	170.3	100.25	36.3	20.0	6.8	74.1	6.0	5.9	7.9	5.1
Divisions:											
Central western	176.4	150.6	167.42	45.0	21.1	6.1	78.9	5.9	0	0	0
Northeastern	104.2	80.1	97.29	43.1	19.2	6.6	80.8	6.5	0	0	0
South central	343.0	248.7	72.85	34.3	35.9	7.0	45.2	6.7	18.9	8.1	5.3
Southwestern	380.5	231.9	65.54	26.0	12.4	5.9	71.5	5.3	16.1	6.5	5.9
Southeastern	334.7	194.6	57.46	26.0	2.9	9.0	91.1	5.4	6.0	8.7	4.3

Regions covered (fig. 1).	Cultivations given.		Area per horse.		Farmers practicing hand labor.	Cost of labor.	
	After plowing and before planting.	After planting.	Cultivated land.	Intertilled crop.		Per day.	Per month.
Ten regions:			*Acres.*	*Acres.*	*Per cent.*		
Best	3	4.9	24.4	6.6	39.8	$1.39	$24.14
Poorest	1.6	4.5	28.4	14.5	56.9	1.09	21.45
Average of all	2.3	4.6	26.4	10.5	46.4	1.25	23.55
Divisions:							
Central western	2.9	4.8	21.6	7.9	28.8	1.53	27.49
Northeastern	2.8	4.7	21.0	5.0	71.4	1.49	25.04
South central	2.3	5.2	35.9	9.0	41.6	.76	17.69
Southwestern	1.0	3.9	27.7	15.7	43.4	1.38	25.00
Southeastern	1.4	4.6	26.9	21.7	73.2	.71	12.41

It is shown in Table II that in the regions making the highest yield of corn the least handwork is done. It is not thought, however, that there is any relation between the amount of hand labor and the yield of corn. Where the topography of a region is level and corn is grown in large acreages in a field, it is usually planted in checks and cultivated in alternate directions. Where this is done, very little hand labor is employed. Where the fields are small or where the land is rolling, checkrowing is not as a rule practiced. In this case hand labor is more extensively employed. Hand labor, therefore, compared with yield must be considered merely as an associated rather than a related factor.

YIELD FACTORS OTHER THAN TILLAGE.

In such a study as this it is impossible to measure the effect of tillage in terms of yield. This is true, for the reason that tillage is only one of the many factors which have to do with yield, and while yields are, for the most part, given in connection with these studies, it is firmly believed that the yields are far more closely related to the inherent fertility of the soil and to the general farm practices than to tillage.

The variations in yields, both regional and on individual farms in a given region, show but scant correlation to variations in tillage practice. There is, however, a striking correlation between yields and type of farming. Yields in the main in the different regions are in inverse ratio to the area of improved land which is in intertilled crops. In some of the regions surveyed other factors enter which affect crop yields, and in those regions this relation between the yield of corn and the area of intertilled crops does not exist. Such conditions are found in Scotland County, N. C., and Hartford County, Conn., where large quantities of commercial fertilizer are used, and in Augusta County, Va., and Bradford County, Pa., where the land is rolling or rough and corn is grown mostly on the bottom lands with hay and pasture on the hillsides. However, notwithstanding these factors, when the regions included in this study are arranged in order of rank in yield, the first 10 show but 29.5 per cent of improved land in intertilled crops, with a yield of 45.4 bushels of corn per acre, while the remainder show an average of 52 per cent of the improved land intertilled, with a yield of only 27.4 bushels of corn per acre. Again, it is well known that in a large measure hay and pasture enter into the rotation to supplement intertilled crops. In other words, far more than for tillage, yields of corn tend to vary directly with the extent to which crops adding organic matter to the soil—hay and pasture crops—enter into the rotation.

ECONOMIC FACTORS INFLUENCING TILLAGE.

In Table I, as in all the general tables, the areas surveyed are placed in the order of bushel yield of corn per acre, starting with the area having the highest yield. The only direct bearing of Tables II and III on tillage is in showing the acreage of cultivated land and of intertilled crops per horse for the regions studied. The other matter presented, however, does have an important indirect bearing on the subject of tillage, in that it gives the reader a general knowledge of existing farm conditions. This information is necessary to a proper interpretation of the purely tillage data presented in subsequent tables.

Table III shows that in the regions where land is less expensive and labor cheap the farms are large, with a small percentage of the land under cultivation. Where land is more expensive the farms are smaller, with a larger percentage of it under cultivation. Of the regions surveyed, the 10 having the highest priced land have an average farm size of 201 acres, with 80 per cent of the farm land tillable. For the 10 regions having the lowest priced land, the average farm size is 291 acres, with only 63 per cent of the farm land tillable.

TABLE III.—*Number of farm projects surveyed, area in farms, average acreage per head of live stock, and average cost of farm labor in twenty-one regions of the United States.*

Region covered (fig. 1).		Date of survey.	Records taken.	Average land per farm.			Average cultivated land per head.		Average land per horse.		Average price of farm labor.	
Key letter.	County and State.			Total.	Cultivated.	Value per acre.	Cattle.	Hogs.	Cultivated.	Intertilled crops.	Per day.	Per month.
				Acres.	*Acres.*		*Acres.*	*Acres.*	*Acres.*	*Acres.*		
A	Tipton, Ind.....	July, 1913	29	184.6	153.0	$209.48	7.8	2.2	21.9	7.4	$1.21	$24.90
B	Montgomery, Ohio	.....do....	29	86.5	76.3	146.96	9.8	2.4	17.9	6.2	1.42	19.00
C	Mercer, N. J.....	Aug., 1913	32	109.6	93.8	101.87	10.3	21.5	17.0	6.9	1.50	26.46
D	Moultrie, Ill.....	Oct., 1912	59	192.9	177.6	198.30	24.7	11.3	18.4	8.8	1.18	28.67
E	Tama, Iowa.....	Aug., 1914	25	148.8	109.7	196.40	4.6	1.6	18.8	7.5	2.00	33.68
F	Kalamazoo, Mich.	Oct., 1913	26	172.8	138.9	101.40	20.3	4.3	28.6	5.7	1.50	24.67
G	Maury, Tenn.....	Nov., 1913	15	389.0	303.3	110.38	7.1	7.6	40.3	7.2	.75	17.95
H	Hartford, Conn...	Oct., 1913	25	93.5	62.7	138.80	4.6	2.2	17.8	5.4	1.68	26.67
I	Bradford, Pa.....	Sept., 1913	28	109.4	83.7	51.20	6.3	16.8	28.3	2.6	1.30	22.00
J	Christian, Ky.....	Nov., 1913	26	404.0	345.0	69.04	29.2	7.0	34.9	8.5	.....	17.43
K	Hamilton, Nebr...	June, 1913	25	261.0	240.0	158.38	13.3	3.1	27.4	9.6	1.94	34.44
L	Rockwall and Grayson, Tex.....	Apr., 1913	24	271.6	230.4	103.41	41.3	25.0	30.9	17.6	1.12	25.00
M	Scotland, N. C....	Nov., 1912	38	274.1	170.8	113.50	37.6	14.4	24.7	19.3	.75	.....
N	Augusta, Va.....	Sept., 1913	28	209.4	142.6	71.80	9.2	14.2	33.8	4.7	1.08	16.40
O	Waushara, Wis...	June, 1913	26	170.4	126.8	48.27	14.0	14.4	30.8	8.9	1.34	31.11
P	Bates, Mo.....	Aug., 1914	25	184.8	146.8	95.00	8.1	3.1	23.3	8.0	1.45	24.25
Q	Alexander, N. C..	Nov. 1913	14	236.0	97.8	39.14	14.6	13.8	32.6	11.2	.77	.....
R	Oklahoma, Okla..	May, 1913	21	214.9	134.3	50.00	13.3	4.8	23.1	15.0	1.12	22.92
S	Pike, Ala.....	Mar., 1913	21	328.4	198.0	36.50	20.8	5.8	31.3	24.2	.71	14.13
T	Holmes, Miss.....	Apr., 1913	25	401.8	215.0	22.40	11.7	18.9	24.7	21.7	.69	10.69
U	Russell, Kans.....	Aug., 1914	25	655.0	331.0	43.20	7.0	7.7	29.0	14.5	1.90	27.10

The number of cattle and hogs found in a region is undoubtedly governed by the available pastures and the price of feeds. Where good pastures abound and where grain and hay can be produced cheaply more cattle and hogs are found.

Less acreage is worked per horse in the regions where improved implements and heavy teams are employed than in the regions where small teams and 1-horse implements predominate. This is probably due partly to the fact that in the Central West, where a small acreage is worked per horse, many colts are raised, and extra mares are kept on the farm for this purpose. The fact that larger yields of crops are made and more live stock kept on the farms in the Middle West where these heavy horses and implements are used makes also for a

greatly increased amount of work other than tillage. Labor, however, is more efficient and a greater acreage is cultivated per man where more horses and better equipment are used. The quality of labor available, the type of farming, and the topography of the land largely regulate the size of teams to be used. With very cheap labor, 1-horse implements may be more economical than heavier implements, since slightly more land is worked with two 1-horse teams than with one 2-horse team.

The cost of labor given is the average of what the farmers interviewed actually pay. Where cheap labor is available crops which require much hand labor predominate.

ACREAGE AND CROP YIELDS.

Table IV gives the reader a general idea of the types of farming practiced in each region surveyed. The normal acreages and normal crop yields, as shown, represent the averages for the farms visited in each region.

TABLE IV.—*Normal average acreage per farm and yield per acre of various crops on the farms surveyed in twenty-one regions of the United States.*

Region covered (fig. 1).		Corn.		Oats.		Wheat.		Hay.	
Key letter.	County and State.	Per farm.	Yield per acre.	Per farm.	Yield per acre.	Per farm.	Yield per acre.	Per farm.	Yield per acre.
		Acres.	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Tons.*
A	Tipton, Ind	52.1	57.4	24.1	51.0	19.6	21.4	35.3	1.89
B	Montgomery, Ohio	20.4	52.3	6.1	40.4	17.5	21.8	16.8	1.67
C	Mercer, N. J	18.0	51.1	.....	.....	7.1	24.2	24.0	1.79
D	Moultrie, Ill	83.5	49.3	28.7	41.2	6.2	21.2	13.5	1.75
E	Tama, Iowa	44.0	46.6	26.6	35.5	.....	20.0	21.5	1.50
F	Kalamazoo, Mich	27.6	41.5	19.9	37.2	39.4	19.8	24.0	1.45
G	Maury, Tenn	54.4	40.9	26.1	31.7	72.0	18.5	47.0	1.57
H	Hartford, Conn	9.3	39.9	1.4	30.0	.....	.....	21.0	1.72
I	Bradford, Pa	7.8	38.2	9.1	30.0	2.5	20.6	25.0	1.70
J	Christian, Ky	55.4	36.9	25.0	30.0	111.6	16.8	77.9	1.08
K	Hamilton, Nebr	83.8	35.0	19.0	28.7	77.0	23.5	[a] 26.2	[a] 3.50
L	Rockwall and Grayson, Tex.	40.8	33.6	49.7	45.6	41.7	18.9	.....	.....
M	Scotland, N. C	40.0	33.0	3.0	49.7	.....	.....	5.3	1.10
N	Augusta, Va	20.0	33.0	.....	.....	37.1	16.0	30.1	1.01
O	Waushara, Wis	18.3	30.4	16.4	22.4	.....	.....	17.7	1.04
P	Bates, Mo	49.0	29.3	21.4	29.0	24.9	19.0	31.9	1.00
Q	Alexander, N. C	25.3	25.2	7.0	10.5	19.1	11.0	.....	.....
R	Oklahoma, Okla	47.2	23.9	16.7	31.5	9.9	16.6	[a] 17.3	[a] 3.67
S	Pike, Ala	56.0	23.1	10.0	35.7	.....	.....	.....	.....
T	Holmes, Miss	112.5	22.0	4.0	25.0	.....	.....	.....	.....
U	Russell, Kans	125.0	20.4	.....	.....	185.0	17.5	[a] 10.0	[a] 2.00

[a] Alfalfa.

TABLE IV.—*Normal average acreage per farm and yield per acre of various crops on the farms surveyed in twenty-one regions of the United States*—Contd.

Key letter.	Region covered (fig. 1). County and State.	Cotton. Per farm.	Cotton. Yield per acre.	Rye. Per farm.	Rye. Yield per acre.	Potatoes. Per farm.	Potatoes. Yield per acre.	Tobacco. Per farm.	Tobacco. Yield per acre.	Pasture and all other crops. Per farm.
		Acres.	*Pounds.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Pounds.*	*Acres.*
A	Tipton, Ind									21.9
B	Montgomery, Ohio							6.0	1,004.8	9.5
C	Mercer, N. J			13.1	20.6	17.5	147.8			14.1
D	Moultrie, Ill									45.7
E	Tama, Iowa									17.6
F	Kalamazoo, Mich									28.0
G	Maury, Tenn			3.3	13.2					100.5
H	Hartford, Conn			1.0	18.3	1.4	151.9	8.3	1,799.0	20.3
I	Bradford, Pa			3.2	16.5					36.1
J	Christian, Ky							27.3	936.0	47.9
K	Hamilton, Nebr									34.0
L	Rockwall and Grayson, Tex.	90.7	720.0							7.5
M	Scotland, N. C	98.6	1,328.0							23.9
N	Augusta, Va									55.4
O	Waushara, Wis			30.3	12.3	18.2	110.4			25.9
P	Bates, Mo									19.6
Q	Alexander, N. C	8.5	794.2	8.1	8.6					29.8
R	Oklahoma, Okla	12.5	580.5							30.7
S	Pike, Ala	94.8	862.5							37.2
T	Holmes, Miss	75.2	704.8							23.3
U	Russell, Kans									11.0

SUBSOILING, DRAINAGE, AND TILLAGE BEFORE PLOWING.

Subsoiling is the process of breaking up or loosening the subsoil without mixing it with the topsoil. This is usually done by plowing a furrow with an ordinary turning plow (fig. 2) and following in the bottom of this furrow with a shovel or bull-tongue plow, which loosens the subsoil but does not bring it nearer the surface or mix it with the topsoil. In some sections partial subsoiling is practiced by running a subsoil plow in the bottom of the corn row before planting the corn, as is the practice in Scotland County, N. C., and Pike County, Ala. The results of subsoiling presented in Table V clearly show that this practice is not extensive and is usually carried on only in regions which have soils low in organic matter.

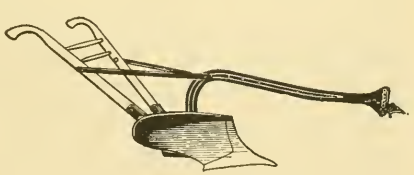

FIG. 2.—A 2-horse turning plow, a type of implement used throughout the corn-growing States.

The amount of data available in regard to subsoiling is so limited that no definite conclusions can be drawn. Table V presents a digest of the opinions of farmers concerning the effect of subsoiling on the crop yield, showing the percentage of those who have practiced it, the season when it is usually done, and the average depth. Opinions were recorded from some farmers who had not practiced subsoiling.

It is interesting to note that these opinions vary with the different kinds of soil. Where there is a sandy or loamy soil underlain with a heavy clay subsoil, as in Maury County, Tenn., the practice of subsoiling is popular. Where the subsoil is of a loamy character, as in Christian County, Ky., the practice is not considered profitable.

TABLE V.—*Corn culture in regard to subsoiling, drainage, and tillage before plowing in twenty-one regions of the United States.*

Region covered (fig. 1).		Subsoiling.					Drainage (farmers reporting).			Tillage before plowing.			
Key letter.	County and State.	Farmers practicing.	Time.	Average depth.	Farmers reporting— For.	Farmers reporting— Against.	Surface.	Part tiled.	All tiled.	Farmers practicing.	Farmers using— Stalk cutter.	Farmers using— Disk harrow.	Farmers using— Log drag.
		Per cent.		*In.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
A	Tipton, Ind.	.....	.....	.....	.....	.....	.....	.....	100	3.4	.....	3.4	.....
B	Montgomery, Ohio	.....	.....	.....	.....	.....	.....	.....	100	3.4	.....	3.4	.....
C	Mercer, N. J.	.....	.....	.....	.....	.....	.....	21.9	46.9	3.1	.....	3.1	.....
D	Moultrie, Ill.	.....	.....	.....	.....	3.4	.....	.....	100	44.0	3.4	40.7	.....
E	Tama, Iowa	.....	.....	.....	.....	.....	36.0	44.0	20.0	32.0	.....	32.0	.....
F	Kalamazoo, Mich.	.....	.....	.....	.....	.....	34.6	3.8	.....	.....	.....	.....	.....
G	Maury, Tenn.	40.0	Fall.	12	33.3	.....	93.3	6.7	.....	.....	.....	.....	.....
H	Hartford, Conn.	.....	.....	.....	.....	.....	68.0	12.0	20.0	.....	.....	.....	.....
I	Bradford, Pa.	.....	.....	.....	.....	.....	67.9	7.1	.....	.....	.....	.....	.....
J	Christian, Ky.	15.4	Fall.	12	.....	11.5	38.5	.....	.....	3.8	.....	3.8	.....
K	Hamilton, Nebr.	.....	.....	.....	.....	.....	4.0	.....	.....	76.0	24.0	72.0	.....
L	Rockwall and Grayson, Tex.	.....	.....	.....	.....	.....	87.5	.....	.....	.....	.....	.....	.....
M	Scotland, N. C.	5.3	Fall.	11	15.8	5.3	[a]79.0	18.0	.....	100	79.0	50.0	.....
N	Augusta, Va.	3.6	...do....	12	3.6	3.6	85.6	14.3	.....	.....	.....	.....	.....
O	Waushara, Wis.	.....	.....	.....	.....	.....	[a]30.0	.....	.....	.....	.....	.....	.....
P	Bates, Mo.	4.0	Spring.	14	4.0	.....	32.0	8.0	.....	44.0	.....	44.0	.....
Q	Alexander, N. C.	.....	.....	.....	.....	.....	100	.....	.....	7.1	.....	7.1	.....
R	Oklahoma, Okla.	.....	.....	.....	4.8	.....	9.5	.....	.....	9.5	9.5	.....	.....
S	Pike, Ala.	33.3	Spring.	10	.....	4.8	100	.....	.....	71.4	71.4	.....	.....
T	Holmes, Miss.	4.0	.....	11	.....	4.0	60.0	.....	.....	32.0	16.0	20.0	4
U	Russell, Kans.	.....	.....	.....	.....	.....	40.0	.....	.....	60.0	.....	60.0	.....

[a] Open ditches.

Three principal types of drainage are practiced in the areas surveyed, namely, surface drainage, open ditches, and tiling. Surface drainage is practiced mostly in the rolling areas and where the soils are low in organic matter. The principal object of such drainage is to prevent erosion. This is accomplished by shallow surface ditches or terraces, which convey the surface water from the fields. These ditches are run with the contours and have enough fall to convey the water rapidly, but not enough to cause erosion. The terraces have less fall than the ditches and the water is conveyed more slowly. Occasionally surface ditches are employed in the bottom lands to carry off the surface water. In some areas the rolling lands are drained by surface ditches and the bottom lands tile drained, as in Tama County, Iowa.

In Scotland County, N. C., and a part of Waushara County, Wis., the low lands are drained by deep, open ditches which surround the fields. These ditches collect the seepage water and answer the same

purpose as tile drains, but occupy much land that might be cultivated if tiling were used. It is probable that this land will be tiled when the relative value of the land occupied by the open ditches is equal to the cost of the tiles.

Tile drainage is practiced extensively only on the most productive soils where land values are extremely high, as in the corn belt of Indiana and Illinois.

Tillage before plowing is practiced most often to break up the stalks left from the previous crop. Where the stalks (mostly cotton and corn) grow rank, better plowing can be done and this vegetable matter decays more quickly if broken up before plowing. These stalks are usually cut with a disk harrow or stalk cutter (fig. 3). In a few localities tillage before plowing is practiced to conserve moisture and to prevent the land from breaking up cloddy, as in western Kansas, where the land is harrowed with a disk in the spring and the corn is planted with a lister without further preparation.

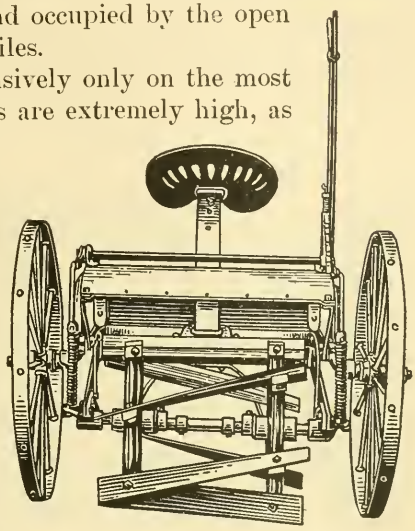

FIG. 3.—A stalk cutter. This implement is used, before plowing, for chopping up stalks and other vegetable matter on the land.

PLOWING.

The choice of time for plowing, whether in the fall or spring, is governed largely by the character of the crop which occupies the land the previous year and by the type of soil. When corn follows sod, more land is generally plowed in the fall than when corn follows some cultivated crop. When land is plowed in the fall it is usually broken deeper than when plowed in the spring.

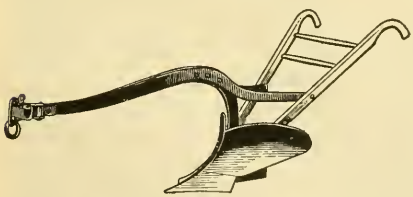

FIG. 4.—A lister, or middle buster, an implement extensively used in the southwestern corn States.

In some sections corn land is plowed in the fall and replowed in the spring before planting. This practice is recorded in Table VI under "Fall and spring plowing." In a few sections the land is sometimes plowed in the fall and then listed in the spring with either a middle buster (fig. 4) or a combined lister and planter (fig. 15), which is almost equivalent to rebreaking. This practice is quite general in the Texas and Oklahoma areas and to some extent in the Kansas area.

TABLE VI.—*Preparation for corn, showing farm practices in regard to times and depth of plowing and the use of plows of various sizes in twenty-one regions of the United States.*

[The key letters under "Region covered" refer to counties and States as follows: A=Tipton, Ind.; B=Montgomery, Ohio; C=Mercer, N. J.; D=Moultrie, Ill.; E=Tama, Iowa; F=Kalamazoo, Mich.; G=Maury, Tenn.; H=Hartford, Conn.; I=Bradford, Pa.; J=Christian, Ky.; K=Hamilton, Nebr.; L=Rockwall and Grayson, Tex.; M=Scotland, N. C.; N=Augusta, Va.; O=Waushara, Wis.; P=Bates, Mo.; Q=Alexander, N. C.; R=Oklahoma, Okla.; S=Pike, Ala.; T=Holmes, Miss.; U=Russell, Kans.]

Region covered (fig. 1).	Fall plowing.			Spring plowing.			Fall and spring plowing.			Farmers turning furrows—		Farmers using plows drawn by—				
	Farmers practicing.	Month.	Average depth.	Farmers practicing.	Month.	Average depth.	Farmers practicing.	Average depth.		Over.	On edge.	1 horse.	2 horses.	3 horses.	4 horses.	5 horses.
								Fall.	Spring.							
	P. c.		*In.*	*P. c.*		*In.*	*P. c.*	*In.*	*In.*	*P. c.*	*P. c.*	*P. c.*	*P. c.*	*P. c.*	*P. c.*	*P. c.*
A	24.1	Nov.	6.5	75.9	Mar., Apr.	6.7	....	....	....	100	....	....	6.9	82.8	6.9	3.4
B	10.3	Nov., Dec.	7.5	89.7	Mar.–May.	7.4	....	....	....	96.6	3.4	....	27.6	69.0	3.4	.....
C	28.1	...do.....	6.3	71.9	Jan., Mar., Apr.	6.3	....	....	....	96.9	3.1	....	50.0	34.4	15.6	.....
D	32.2	Sept., Oct.	5.7	67.8	Apr., May.	5.3	....	....	....	88.1	11.9	....	1.7	28.8	67.8	1.7
E	12.0	Oct.....	5.0	88.0	...do.....	4.8	....	....	....	100	.....	.....	.....	56.0	40.0	4.0
F	3.8	...do.....	7.0	96.2	...do.....	6.6	....	....	....	100	.....	.....	7.7	61.6	26.9	3.8
G	46.7	Sept.,Nov.	7.9	40.0	Mar.....	7.7	13.3	7.5	5.0	100	.....	.....	60.0	40.0	.....	.....
H	8.0	Oct.....	7.0	92.0	Apr., May.	7.4	....	....	....	100	.....	.....	76.0	24.0	.....	.....
I	21.4	Oct., Nov.	6.7	78.6	...do.....	6.0	....	....	....	100	.....	3.6	71.4	25.0	.....	.....
J	53.8	Nov.....	7.2	38 5	Apr.....	6 6	7.7	9.0	7.0	100	.....	.....	23.1	76.9	.....	.....
K	8.0	Oct., Dec..	6.0	92.0	Mar., Apr.	5.8	....	....	....	100	.....	.....	.....	4.0	96.0	.....
L	33.3	Sept., Dec.	6.8	37.5	Jan., Feb..	5.6	29.2	6.7	7.0	.....	100	.....	25.0	4.2	74.9	[a]8.3
M	0	.....	.....	94.7	Jan.–Apr..	5.3	5.3	10.2	5.0	39.5	60.5	23.7	78.9	2.6	.....	.....
N	28.6	Nov., Dec.	8.6	71.4	...do.....	7.8	....	....	....	100	.....	.....	71.4	28.6	.....	.....
O	50.0	Oct., Nov.	5.5	50.0	May.....	5.5	....	....	....	100	.....	.....	42.3	50.0	7.7	.....
P	40.0	.....	6.0	60.0	.....	5.7	....	....	....	100	.....	.....	12.0	32.0	56.0	.....
Q	7.1	Nov.....	6.0	57.2	Mar., Apr.	5.9	35.7	7.8	4.0	92.9	7.1	35.7	100	.....	.....	.....
R	0	.....	.....	81.0	Jan.–Apr..	5.1	19.0	6.2	4.8	47.6	23.8	.....	42.8	57.1	14.3	.....
S	4.8	Nov.....	10.0	90.5	Jan.–Mar..	6.3	4.8	10.0	4.0	28.6	71.4	61.9	42.8	.....	.....	.....
T	4.0	...do.....	8.0	88.0	...do.....	4.8	8.0	6.0	4.0	12.0	88.0	40.0	68.0	.....	.....	.....
U	4.0	...do.....	5.0	96.0	Mar., Apr.	5.3	....	....	....	12.0	88.0	.....	.....	.....	100	.....

[a] Engine and gang plow.

In sections where little vegetable matter is plowed under, a type of plow is often used which leaves the furrow slice on edge instead of completely turning it over. This practice of edging the furrows is very common where 1-horse plows (fig. 5) are used, as in the hill regions of Alabama and Mississippi, or where middle busters and listers are used for breaking, as in Kansas, Texas, and Oklahoma.

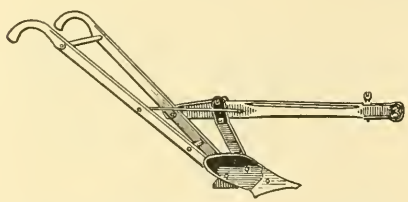

FIG. 5.—A 1-horse turning plow, commonly used for breaking land in the Southern States.

The depth of breaking land is largely governed by the type of soil. Sandy or loam soils, unless underlain with stiff subsoil, are usually broken deeper than the heavy clay soils.

The size of plows used is regulated by the type of farming practiced, the topography, the type of soil, and the general prosperity and condition of the community. In the South Atlantic States crops are grown which require much hand labor. Loamy soils predominate

and land is comparatively cheap. Here 1-horse teams (fig. 6) and 2-horse teams are largely used for plowing. In the Central Western

FIG. 6.—Plowing with 1-horse turning plows. These implements are often used in the Southern States for breaking land.

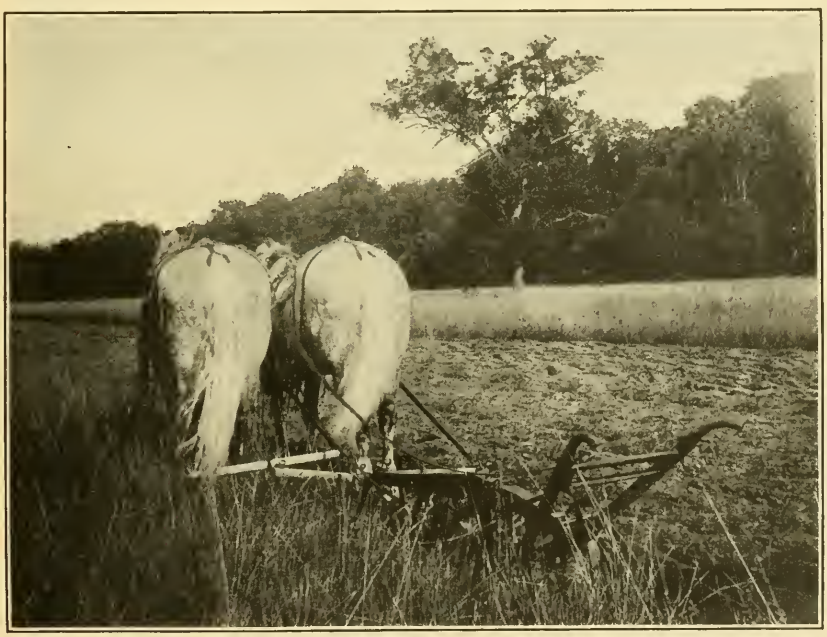

FIG. 7.—A 2-horse turning plow with chain attached, as used in Waushara County, Wis., to turn a heavy growth of vegetable matter.

States a more extensive type of farming is practiced. The land is level, clay soils predominate, and land values are high. Here heavier teams (fig. 7) are used.

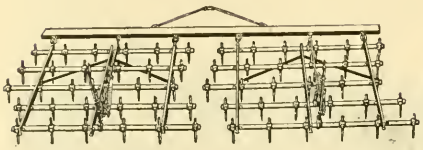

FIG. 8.—A spike-tooth harrow, an implement in general use to prepare the seed bed, after plowing, for corn.

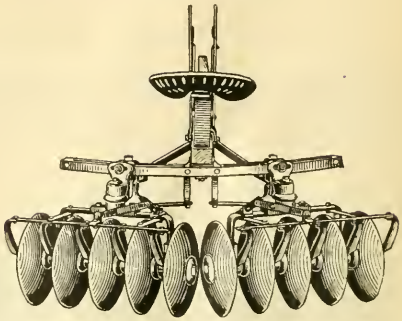

FIG. 9.—A disk harrow, an implement extensively used for preparing the seed bed, after plowing, for corn.

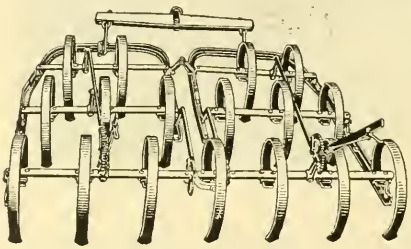

FIG. 10.—A spring-tooth harrow, used extensively in Michigan, Pennsylvania, and New Jersey in preparing the seed bed, after plowing, for corn.

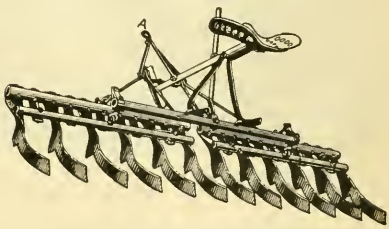

FIG. 11.—An acme harrow, an implement especially adapted for thoroughly pulverizing the seed bed for corn. The evener is attached at A.

FIG. 12.—A spring-tooth harrow, showing its use in preparing sandy-loam land, after plowing, for corn.

TILLAGE IMPLEMENTS USED AFTER PLOWING AND BEFORE PLANTING.

Table VII is presented to show what implements are used in preparing the land for corn after plowing and to show where and to what extent each implement is used. The kind of implement used is governed by the type of farming practiced, the topography of the land, and the type of soil.

FIG. 13.—A plank drag, an implement used in some regions instead of a roller to prepare cloddy land for corn.

The spike-tooth harrow (fig. 8) is extensively used in almost every region visited.

The disk harrow (fig. 9) is also extensively used, but where the land is extremely rolling or stony the spring-tooth harrow (fig. 10) is more popular. The acme harrow (fig. 11) is used only on soils free from stones, but is well adapted for thoroughly pulverizing the seed bed on such soils. The spring-tooth harrow is also often used on loamy soils (fig. 12). The plank drag (fig. 13) and roller (fig. 14) are used on soils which easily become cloddy and to compact light, porous soils. For the more pro-

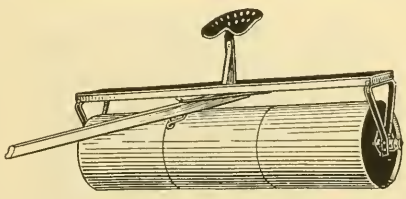

FIG. 14.—A land roller, an implement used for preparing the seed bed, and to compact light, porous soils, after plowing, for corn.

ductive soils more time is given to preparing the land before planting than where the soil is less productive.

TABLE VII.—*Preparation of the seed bed for corn, showing tillage practices, implements used after plowing and before planting, and average number of workings in twenty-one regions of the United States.*

[The key letters under "Region covered" refer to counties and States as follows: A=Tipton, Ind.; B=Montgomery, Ohio; C=Mercer, N. J.; D=Moultrie, Ill.; E=Tama, Iowa; F=Kalamazoo, Mich.; G=Maury, Tenn.; H=Hartford, Conn.; I=Bradford, Pa.; J=Christian, Ky.; K=Hamilton, Nebr.; L=Rockwall and Grayson, Tex.; M=Scotland, N. C.; N=Augusta, Va.; O=Waushara, Wis.; P=Bates, Mo.; Q=Alexandria, N.C.; R=Oklahoma, Okla.; S=Pike, Ala.; T=Holmes, Miss.; U=Russell, Kans.]

Region covered (fig. 1).	Harrow.								Roller.		Plank drag.		Turning plow for bedding.		To lay off rows.				Other implements.		Workings.
	Spike-tooth.		Disk.		Spring-tooth.		Acme.								1-horse single-shovel plow.		Lister.				
	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	Farm using.	All work.	
	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct	
A	89.7	33.3	93.1	38.3	13.8	4.9	....	....	44.8	16.1	13.8	4.9	....	....	....	....	....	....	[a] 6.9	2.5	2.8
B	82.8	30.4	69.0	32.1	41.4	20.0	....	....	44.8	17.2	....	....	....	....	....	....	....	....	....	....	3.6
C	93.7	30.6	65.6	30.6	40.6	14.4	18.7	7.3	6.2	1.8	53.2	15.3	....	....	....	....	....	....	....	....	3.5
D	91.5	38.3	91.5	50.0	....	....	....	....	33.8	11.7	....	....	....	....	....	....	....	....	....	....	3.0
E	100	59.5	92.0	40.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3.0
F	53.8	16.1	3.8	1.2	100	49.4	....	....	96.2	33.3	....	....	....	....	....	....	....	....	....	....	3.3
G	66.7	26.8	100	65.9	....	....	6.7	2.5	6.7	4.9	....	....	....	....	....	....	....	....	....	....	2.7
H	72.0	34.4	76.0	44.3	....	....	36.0	18.0	....	....	8.0	3.3	....	....	....	....	....	....	....	....	2.4
I	28.6	11.3	3.6	1.4	100	84.5	....	....	7.1	2.8	....	....	....	....	....	....	....	....	....	....	2.5
J	80.7	28.6	100	66.2	....	....	....	....	15.4	5.2	....	....	....	....	....	....	....	....	....	....	3.0
K	96.0	63.5	84.0	24.9	....	....	....	....	4.0	1.6	....	....	....	....	....	....	....	....	....	....	2 5
L	66.7	59.4	4.2	2.7	....	....	....	....	....	....	....	....	4.2	2.7	....	....	33.3	21.6	[b] 20.8	13.5	1.5
M	13.2	6.8	26.3	12.5	....	....	....	....	....	....	....	....	52.6	22.7	86.9	39.8	18.4	8.0	[c] 26.3	11.4	2.3
N	28.6	9.6	60.7	26.5	85.5	54.2	....	....	24.8	9.6	....	....	....	....	....	....	....	....	....	....	3.0
O	100	60.1	69.2	39.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.8
P	100	63.7	56.0	29.2	....	....	....	....	16.0	7.1	....	....	....	....	....	....	....	....	....	....	2.3
Q	78.6	87.5	14.3	12.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1.1
R	52.4	38.7	9.5	6.5	....	....	....	....	....	....	....	....	....	....	....	....	14.3	9.7	[b] 66.7	45.1	1.5
S	....	....	....	....	....	....	....	....	....	....	....	....	....	....	23.8	41.6	33.3	58.3	....	....	.6
T	52.0	38.2	20.0	14.7	....	....	4.0	2.9	....	....	4.0	2.9	28.0	20.6	20.0	14.7	8.0	5.7	....	....	1.4
U	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	[b] 100	100	....

[a] Six-horse combination harrow and drag. [b] Lister and planter combined. [c] Cultivators.

METHODS OF PLANTING AND KINDS OF PLANTERS USED.

Whether corn is planted level, on beds, or listed depends largely on climatic conditions and on the type of soil. Throughout the Central Western and Northern States corn is generally planted level. (Table VIII.) Where land is poorly drained corn is sometimes planted on beds. In the Southern and Southwestern States, where light soils predominate and where hot and dry weather often prevails during the growing season, corn is frequently planted in the bottom of the furrow several inches below the surface level. This process is known as listing. This furrow is usually made with a double moldboard type of plow, known as a middle buster or lister (fig. 4), which throws the dirt to both sides. In the Texas, Oklahoma,

and Kansas areas a combined lister and planter (fig. 15) is frequently used. A form of listing often employed in some of the Southern States, where 1-horse plows are largely used, is to throw the land into beds as it is broken and plant the corn in the water furrow between the beds.

TABLE VIII.—*Dates and methods of planting corn, showing the kinds of planters used in twenty-one regions of the United States.*

[The key letters under "Region covered" refer to counties and States as follows: A=Tipton, Ind.; B=Montgomery, Ohio; C=Mercer, N. J.; D=Moultrie, Ill.; E=Tama, Iowa; F=Kalamazoo, Mich.; G=Maury, Tenn.; H=Hartford, Conn.; I=Bradford, Pa.; J=Christian, Ky.; K=Hamilton, Nebr.; L=Rockwall and Grayson, Tex.; M=Scotland, N. C.; N=Augusta, Va.; O=Waushara, Wis.; P=Bates, Mo.; Q=Alexander, N. C.; R=Oklahoma, Okla.; S=Pike, Ala.; T=Holmes, Miss.; U=Russell, Kans.]

Region covered (fig. 1).	Date.		Farmers planting—						Farmers using planter—					
	Average.	Range.	Level.	On beds.	Listing.	Between beds.	In checks.	In drills.	Hand.	1-horse.	2-horse.		3-horse 1-row.	4-horse 1-row.
											2-row.	1-row.		
			P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
A	May 9	May 1 to 20	96.6	....	3.4	....	86.2	13.8	....	....	100	....	....	.....
B	May 11	April 30 to May 25	65.5	....	34.5	....	3.4	96.6	....	....	100	....	....	.....
C	May 10	April 28 to June 2	93.7	....	6.3	....	71.9	28.1	46.9	....	53.1	....	....	.....
D	May 17	May 3 to June 14	100	....	.....	....	100	.....	....	....	100	....	....	.....
E	May 12	May 1 to 30	100	....	.....	....	100	.....	....	....	100	....	....	.....
F	...do....	May 5 to 20	100	....	.....	....	96.2	3.8	....	....	100	....	....	.....
G	Apr. 15	Mar. 15 to June 10	86.7	....	13.3	....	.....	100	....	20	80	....	....	.....
H	May 23	May 5 to June 10	100	....	.....	....	20	80	16	48	24	....	....	.....
I	May 26	May 10 to June 6	100	....	.....	....	32.1	67.9	50	14.3	35.7	....	....	.....
J	Apr. 22	Apr. 1 to May 25	100	....	.....	....	73.1	26.9	13.6	4.6	81.8	....	....	.....
K	May 14	May 9 to 25	96	....	4	....	96	4	....	....	100	....	....	.....
L	Mar. 17	Feb. 25 to Apr. 25	41.6	12.5	37.5	8.4	12.5	87.5	4.2	8.4	41.6	41.6	....	4.2
M	Apr. 7	Mar. 10 to May 18	.....	....	10.5	89.5	.....	100	2.6	97.4	.....	.....	.....	.....
N	Apr. 29	Apr. 20 to May 11	100	....	.....	....	39.3	60.7	3.6	17.8	78.6	....	....	.....
O	May 16	May 10 to 27	100	....	.....	....	50	50	38.5	....	61.5	....	....	.....
P	May 10	Apr. 15 to May 20	88	....	12	....	88	12	....	....	100	....	....	.....
Q	Apr. 18	Apr. 7 to 30	100	....	.....	.....	.....	100	64.3	35.7	.....	.....	.....	.....
R	Apr. 5	Mar. 5 to May 1	9.5	....	90.5	....	4.8	95.2	....	23.8	23.8	33.4	4.7	14.3
S	Mar. 22	Mar. 3 to Apr. 5	.....	....	19	81	.....	100	42.9	57.1	.....	.....	.....	.....
T	Apr. 5	Mar. 1 to July 24	8	36	8	48	.....	100	56	44	.....	.....	.....	.....
U	May 6	Apr. 15 to May 25	.....	....	100	....	.....	100	.. ..	..	.....	.....	....	100

Whether corn is planted in checks or drilled depends largely on the extent corn is grown, on the size and shape of the fields, and on the topography of the land. Where the topography will permit and corn is extensively grown, it is usually planted in checks, because it can be kept free from weeds and cultivated easier in this way. Where listing (fig. 16) is practiced the corn is seldom checked. If planted level it may be checked or drilled.

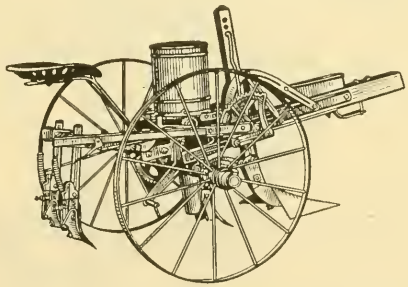

FIG. 15.—A combined lister and corn planter, an implement extensively used in Texas, Oklahoma, and Kansas.

The kind of planter used depends largely on the extent to which corn is grown and on the general prosperity of the region. Where

corn is not extensively grown and where labor is cheap, the planting is usually done by hand or with a 1-horse planter (fig. 17). When

FIG. 16.—Planting corn by the modified form of listing. The row is plowed out with a shovel plow attached to the cultivator. The shovel is run twice for each row and corn is planted in the bottom of this furrow. By using a cultivator with the two shovels attached for laying off the rows, a uniform width of row is maintained.

planted by hand, either a hand planter (fig. 18) is used or the rows are run out with a plow, the corn dropped by hand (fig. 19) and the covering is done with a plow, with a hoe, or with the foot. Where corn is extensively grown and the land is level, a 2-horse checkrow planter that drops and covers two rows at once (fig. 20) is almost

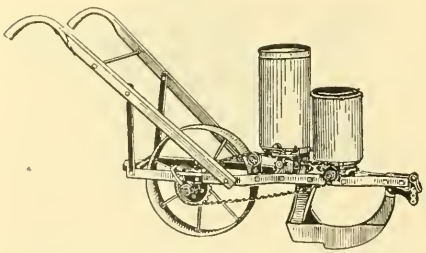

FIG. 17.—A 1-horse corn planter, in use where the crop is not extensively grown.

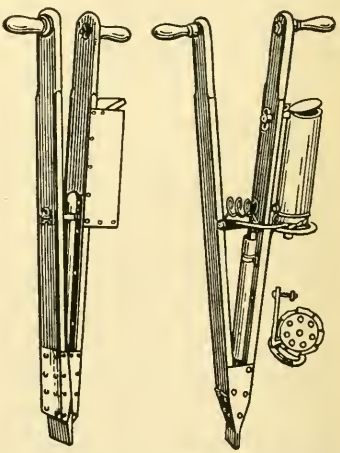

FIG. 18.—Hand corn planters, or bill picks, a type of implement used where labor is cheap.

universally used. Where a lister is attached to the planter, only 1-row planters are used and the number of horses required de-

pends on the size of the lister, the depth of listing, and the kind of soil.

PLANTING, REPLANTING, AND HAND CULTIVATION.

Whether corn is planted in drills or checks depends principally on the topography of the land and the extent to which the crop is

FIG. 19.—Planting corn in Scotland County, N. C., without the use of a planter. The row is laid off with a 1-horse plow, the corn dropped by hand, and the covering done with a plow, with a hoe, or with the foot.

grown. If the land is level and corn is extensively grown it is usually planted in checks, as in the Central Western States. Where the land is rolling or where corn is a minor crop, as in the Southern States, it is usually planted in drills. Where corn is planted in checks more cultivation is given than where it is planted in drills. (Table IX.)

The thickness of planting depends on the fertility of the soil. On the most productive soils corn is planted thickest.

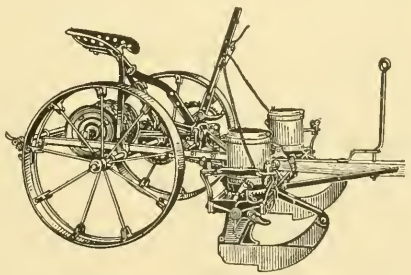

FIG. 20.—A 2-horse checkrow corn planter, for dropping and covering two rows at once, used on level land where the crop is extensively grown.

The hand labor consists largely in chopping out weeds and replanting missing hills. This is usually done at the first or second cultivation. In the regions where crops requiring considerable hand labor predominate, as in the cotton-growing States, more hand labor is employed for the corn crop.

TABLE IX.—*Corn culture in regard to planting, replanting, average number of cultivations, and yields per acre in twenty-one regions of the United States.*

Key letter.	Region covered (fig. 1). County and State.	Farmers planting in— Drills.	Farmers planting in— Checks.	Drill averages. Between rows.	Drill averages. Between hills.	Drill averages. Stalks per hill.	Drill averages. Space per stalk.	Check averages. Between rows.	Check averages. Between hills.	Check averages. Stalks per hill.	Check averages. Space per stalk.	Farmers practicing— Replanting.	Farmers practicing— Hand cultivation.	Cultivations.	Normal yield per acre.
		P. ct.	*P. ct.*	*Feet.*	*Feet.*		*Sq. ft.*	*Feet.*	*Feet.*		*Sq. ft.*	*P. ct.*	*P. ct.*		*Bu.*
A	Tipton, Ind.	13.8	86.2	3.5	1.2	1	4.2	3.5	3.5	2.5	4.9	0	10	5.5	57.4
B	Montgomery, Ohio.	96.6	3.4	3.4	1.3	1	4.4	3.5	3.7	4	3.2	17.3	55.1	4	52.3
C	Mercer, N. J.	28.1	71.9	3.8	1.2	1	4.6	3.9	3.8	3	4.9	68.7	75	5.9	51.1
D	Moultrie, Ill.		100					3.4	3.4	2.4	4.8	1.7	35.6	4.4	49.3
E	Tama, Iowa		100					3.5	3.5	3	4.1	24	24	5.3	46.6
F	Kalamazoo, Mich.	3.8	96.2	3.7	1	1	3.7	3.7	3.7	2.5	5.5	7.7	26.9	5	41.5
G	Maury, Tenn.	100		3.7	1.4	1	5.2					13.3	16.7	5.4	40.9
H	Hartford, Conn.	80	20	3.4	2.1	3.4	2.1	3.3	3.3	4.2	2.5		68	3.8	39.9
I	Bradford, Pa.	67.9	32.1	3.3	.9	1.4	2.1	3.3	3.3	3.7	2.9	25	71.4	4.4	38.2
J	Christian, Ky.	26.9	73.1	3.7	1.7	1	6.3	3.7	3.8	2.1	6.7	7.7	15.4	5.1	36.9
K	Hamilton, Nebr.	4	96	3.5	1.2	1	4.2	3.5	3.5	2.6	4.7	8	8	5.1	35
L	Rockwall and Grayson, Tex.	87.5	12.5	3.4	2.1	1.1	6.5	3.6	3.5	1.5	8.4	4.1	87.5	3.9	33.6
M	Scotland, N. C.	100		5.5	1.6	1.3	6.8					76.3	81.6	4.3	33
N	Augusta, Va.	60.7	39.3	3.5	1.8	1.2	5.2	3.5	3.6	2	6.3	42.8	82.1	4.1	33
O	Waushara, Wis.	50	50	3.5	1.1	1.1	3.5	3.5	3.5	2	6.1	3.8	3.8	5.4	30.4
P	Bates, Mo.	12	88	3.5	1.3	1	4.6	3.5	3.6	2.5	5	40	40	4.8	29.3
Q	Alexander, N. C.	100		4.1	2.1	1	8.6					71.4	92.9	5.1	25.2
R	Oklahoma, Okla.	95.2	4.8	3.5	1.4	1	4.9	3.5	3.5	2	6.1	4.8	42.8	3.9	23.9
S	Pike, Ala.	100		5.3	2	1.4	7.6					52	66	4.7	23.1
T	Holmes, Miss.	100		3.8	2.2	1.3	6.4					30	72	4.7	22
U	Russell, Kans.	100		3.5	1.6	1	5.6							3.8	20.4

GENERAL FARM PRACTICES AND CONDITIONS.

SURVEYS IN TIPTON COUNTY, IND.

The tillage records for Indiana were taken in the central part of Tipton County (Table X). This is in the corn-belt prairie section (fig. 1, A). The soil is a silty clay loam about 8 inches deep with a heavier clay-loam subsoil. The soils are dark brown to almost black in color and are very productive, especially the darker type. The country is very flat and appears as a continuous plain.

Many improvements have been made in this county. Practically all the land has been tile drained, the farmers having cooperated in establishing central drainage systems to dispose of the water. Exceptionally good roads are maintained. Every section line is a public road and nearly all the roads have been graveled. A system of central schools has been established to take the place of the local county schools. The land is worked mainly by the owners. The farmers live in good houses and have well-kept barns and outbuildings, which give to the country a very prosperous appearance.

The farm practices for the section are very uniform. Most farmers maintain a general rotation of corn one year, wheat or oats one year, and hay or pasture one or two years. Some timothy is grown, but most of the hay is clover. Considerable truck, such as garden peas, tomatoes, and sweet corn, is grown for the canning factories.

A few pear orchards are found, but very little fruit is grown except for home use. Hogs are extensively raised and furnish one of the principal sources of farm income. Numerous cattle, mostly of the beef type, are kept.

TABLE X.—*Tillage practices with corn in Tipton County, Ind., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 8 and 10 to 16 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.							Tillage after planting.										Normal yield per acre (bushels).
		Harrow.				Plank drag.	6-horse combined harrow and drag.	All workings.	Spike-tooth harrow.	Roller.	Cultivator.				Mower wheel.	Total cultivations.			
		Disk.	Spring-tooth.	Spike-tooth.	Roller.						2-horse 4-shovel.	Spring-tooth 10-shovel.	2-horse 8-shovel	2-horse 6-shovel.		Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	7	1	....	3	2	....	....	3	1	....	....	....	.....	2 to 5	....	1	4	5	50
2	6	1	....	3	2	....	....	3	....	1	....	....	.....	2, 3, 4	....	1	3	4	60
3	8	1	....	3	2	....	....	3	1	....	....	....	.....	2 to 5	....	1	4	5	60
4	6	1	....	2	....	....	....	2	2	1	....	....	.....	3, 4, 5	....	2	3	5	50
5	6	1	....	3	2	....	....	3	1	2	....	....	3 to 7	.....	....	2	5	7	50
6	7	1	....	3	2	....	....	3	....	....	1to4	....	.....	.....	5	....	5	5	45
7	7	1	....	....	....	....	2	2	1	2	....	....	.....	3 to 6	....	2	4	6	75
8	7	....	1	....	2	3	....	3	....	1, 3	....	....	.....	2 to 6	....	2	4	6	60
9	6	1	....	2	....	....	....	2	1	....	....	....	.....	2 to 5	....	1	4	5	50
10	7	1	....	2, 4	....	3	....	4	1	2	....	....	.....	3 to 6	....	2	4	6	50
11	5	1	....	2	....	....	....	2	1	....	....	....	.....	2 to 5	....	1	4	5	65
12	6	1, 2	....	4	....	3	....	4	1	[a]2	....	....	.....	3 to 7	....	2	5	7	50
13	6	1, 2	....	3	....	....	....	3	1	2	....	....	.....	3, 4, 5	6	2	4	6	60
14	5	1	....	3	2	....	....	3	1	....	....	2	.....	3, 4, 5	....	1	4	5	50
15	8	1	3	2	....	....	4	4	2	1	....	....	.....	3 to 6	....	2	4	6	55
16	7	1	....	2	....	....	....	2	1	....	....	....	.....	2 to 5	....	1	4	5	60
17	7	1	....	2	....	....	....	2	2	1, 4	....	....	3, 5, 6, 7	.....	8	3	5	8	65
18	7	....	1	2	3	....	....	3	....	1, 2	....	....	3, 4, 5	.....	....	2	3	5	60
19	6½	1	....	3	2	....	....	3	....	1	....	....	.....	2 to 5	....	1	4	5	50
20	6	1, 2	....	3	....	....	....	3	1	2	....	....	.....	3 to 6	....	2	4	6	60
21	6	1	2	....	....	....	....	2	1	2	....	....	.....	3 to 6	....	2	4	6	55
22	7	1	....	2	3	....	....	3	1	....	....	....	.....	2, 3, 4	....	1	3	4	65
23	8	1	....	2	....	....	....	2	2	1	....	....	.....	3 to 7	....	2	5	7	60
24	7½	1	....	3	2	....	....	3	1	....	....	....	2 to 5	.....	....	1	4	5	60
25	7	1	....	2	....	....	....	2	1	....	....	....	2, 3, 4	.....	....	1	3	4	50
26	8	1	....	2	....	....	....	2	....	1	....	....	.....	2 to 5	....	1	4	5	50
27	7	1, 2	....	4	....	3	....	4	1	2	....	....	.....	3 to 6	....	2	4	6	75
28	6	1	....	3	2	....	....	3	1	2	....	....	3 to 6	.....	....	2	4	6	75
29	6	1	....	3	2	....	....	3	1	....	....	....	.....	2, 3, 4	....	1	3	4	50
Farms using, per cent	....	93.1	13.8	89.7	44.8	13.8	6.9	....	79.3	62.1	3.4	3.4	20.7	75.9	10.3	96.6	....	....	....
Average	6.7	....	....	....	....	....	....	2.8	....	....	....	....	.....	.....	....	....	3.9	5.5	57.4

[a] Plank drag.

About 75 per cent of the corn land is broken in the spring. Three-horse sulky plows (fig. 21) are largely used for breaking. The usual custom of preparation is to follow the plow with the disk harrow, then roll, and harrow with the spike-tooth harrow before planting. The planting is done with the 2-horse 2-row planter and the corn

is planted in checks 3½ feet apart each way, alternating the hills with two and three kernels.

After planting, the field is usually gone over with the spike-tooth harrow or roller, first before and again after the corn is up. After this most of the cultivating is done with the 2-horse 6-shovel cultivator (fig. 22). The customary practice is to give four cultivations in alternate directions.

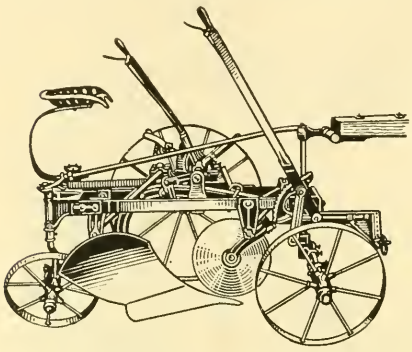

FIG. 21.—A sulky plow (for either two or three horses) used in the Central West.

Few cover crops are grown and the corn land is usually either seeded to wheat in the fall or oats the following spring. Very little commercial fertilizer is used, but stable manure is frequently applied broadcast to the land before breaking for corn. The corn is mostly of the yellow dent varieties, but some white dent is grown.

The most prevalent weeds for this section are foxtail, quack-grass, smartweed, plantain, ragweed, cocklebur, whitetop, and bull nettle.

SURVEYS IN MONTGOMERY COUNTY, OHIO.

The tillage records for Montgomery County, Ohio, were taken in the section around Brookville, in the northwestern part of the county. (Table XI.) The soil is of a silty clay-loam character with a clay subsoil. The land is rolling enough to allow good drainage, but not steep enough to interfere with the use of improved machinery, and the fields are of uniform size and convenient shape. Most of this land is tile drained and only a few surface ditches are necessary.

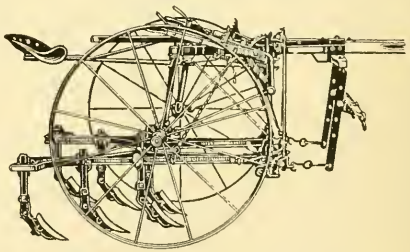

FIG. 22.—A 2-horse 6-shovel corn cultivator.

The leading roads have been macadamized. Good country schools are maintained. Most of the farms are rather small and are operated by the owners. They have exceptionally good farmhouses and outbuildings, and the country has a very prosperous appearance.

A very uniform system of farming is practiced in this section. On most farms a rotation of corn or tobacco one year, wheat or oats one year, and hay or pasture one or two years is maintained. Some alfalfa is grown with good results. Considerable red and alsike clover seed is produced. Little or no fruit is grown for market and

little truck is produced. Hogs and cattle are extensively grown, but tobacco and wheat are the leading money crops.

Corn is usually grown on sod land, and in preparing for corn most of the breaking is done in the spring with a 3-horse sulky plow and immediately harrowed with a spike-tooth or disk harrow. Then before planting, the land is harrowed again with the spike-tooth harrow and rolled. The corn is usually planted in drills, with a 2-horse 2-row planter. The rows are usually $3\frac{1}{2}$ feet apart, with one stalk every 18 inches in the drill.

TABLE XI.—*Tillage practices with corn in Montgomery County, Ohio, showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 6 and 8 to 12 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.					Tillage after planting.								Normal yield per acre (bushels).
		Harrow.			Roller.	All workings.	Spike-tooth harrow.	Roller.	Cultivator.			Total cultivations.			
		Spring-tooth.	Disk.	Spike-tooth.					2-horse.		1-horse, 5 shovel.	Harrow, weeder, or roller.	Other implements.	All workings.	
									8-shovel.	6-shovel.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	6	.....	.....	1,2	3	3	1	.....	2,3	.....	....	1	2	3	50
2	8	1,2,3	.....	.....	.....	3	....	1	.....	2,3,4	....	1	3	4	65
3	6	.....	1,2	3	.....	3	1	.....	.....	2,3,4	....	1	3	4	75
4	$6\frac{1}{2}$	1	.....	.....	.....	1	.....	.....	1,2,3	.....	....	.....	3	3	40
5	8	.....	1	2	.....	2	.....	.....	1,2	.....	....	.....	2	2	65
6	7	.....	1	2	3	3	....	1	.....	2,3,4	....	1	3	4	40
7	7	1	.....	2,3	.....	3	1	2	3,4	.....	....	2	2	4	65
8	8	2,4	.....	.....	1,3,5	5	....	.....	1,2,3	.....	....	.....	3	3	45
9	7	.....	1,4	3	2	4	.....	.....	1,2,3	.....	....	.....	3	3	40
10	7	.....	1	2,4	3	4	.....	.....	.....	1,2,3	....	.....	3	3	65
11	7	.....	3,4	1,2,5	.....	5	2,3	1	4,5,6	.....	....	3	3	6	50
12	$7\frac{1}{2}$	.....	1,2	3	.....	3	1	.....	.....	2,3	....	1	2	3	45
13	6	1,2,5	.....	3,4	.....	5	....	1	.....	2,3,4	5	1	4	5	66
14	$8\frac{1}{2}$	.....	1,2	3	.....	3	1	.....	.....	2,3	....	1	2	3	50
15	8	.....	1	3	2	3	1	.....	.....	2,3,4	....	1	3	4	50
16	$6\frac{1}{2}$	1,3,4	.....	.....	2	4	....	1	.....	2,3,4	....	1	3	4	50
17	7	.....	1,2	3,4	.....	4	1	2	.....	3 to 6	....	2	4	6	70
18	8	.....	1	2	.....	2	.....	.....	1 to 4	.....	....	.....	4	4	30
19	6	.....	1	2	.....	2	1	3	4,5	2	....	2	3	5	40
20	6	.....	1 to 4	5	.....	5	1	.....	.....	2,3,4	....	1	3	4	40
21	7	.....	1,2,5	4	3	5	2	1,3	4,5,6	.....	....	3	3	6	65
22	$6\frac{1}{2}$	2	1	3	4	4	....	.....	.....	1,2,3	....	.....	3	3	50
23	$5\frac{1}{2}$	1,2	.....	.....	3,4,5	5	.....	.....	1,2,3	.....	....	.....	3	3	25
24	7	1,2	.....	4	3	4	.....	.....	1,2,3	.....	....	.....	3	3	50
25	7	.....	2	1	.....	2	1	.....	.....	2,3,4	....	1	3	4	50
26	$7\frac{1}{2}$	4	1,2	6	[a]3,5	6	....	1	.....	2,3,4	....	1	3	4	65
27	8	1	3,4	2	5	5	....	1,3	2	4,5	....	2	3	5	60
28	8	.....	1,2	3,4	.....	4	1,2	[a]3	.....	4,5	....	3	2	5	50
29	7	1	2	3	.....	3	....	1,3	.....	2,4,5	....	2	3	5	60
Farms using, per cent	....	41.4	69	82.8	44.8	....	44.8	44.8	44.8	62	3.4	69	.....	...	.....
Average	7.1	.....	.....	.....	.....	3.6	....	.....	.....	.....	....	....	2.9	4	52.3

[a] Plank drag.

After planting, the cultivation methods are very uniform. When the corn is up, the field is usually gone over with the spike-tooth harrow or roller and then cultivated three times with a 2-horse 6 or 8 shovel cultivator (fig. 23). The cultivating is generally level.

The yellow dent varieties of corn are usually grown.

Some commercial fertilizer is used and considerable stable manure is produced and applied broadcast. Cover crops are seldom grown.

The most prevalent weeds found in this region are foxtail, ragweed, pigweed, wild carrot, whitetop, and buttonweed.

SURVEYS IN MERCER COUNTY, N. J.

The records for Mercer County, N. J., were taken mostly in the potato-growing sections south of Trenton. (Table XII.) The soil here is principally of a sandy-loam nature, with a clay subsoil. Occasionally this clay is underlain with gravel. The land is rolling enough to afford good natural drainage, except in the bottoms, where it is necessary to use tile. These bottom lands are practically all tiled. The country is level enough to enable the farmers to have fields of uniform size and shape and to use improved machinery to good advantage.

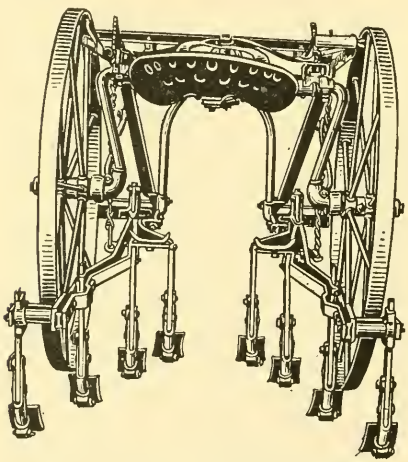

FIG. 23.—A 2-horse, 8-shovel cultivator.

The county is generally prosperous. Most farmers have good houses, good rural schools are maintained, and the principal roads have been macadamized.

The soil, being of a porous character, is rather low in humus content, and responds readily to a humus supply of any kind. Large quantities of commercial fertilizer are used on potatoes and corn and mostly applied in the drill before planting.

The tillage practices and rotations are of a rather definite type in this region. Nearly all the farms maintain a rotation of corn one year, potatoes one year, rye or wheat one year, and hay one or two years. Considerable truck and fruit is grown near Trenton and on some farms this furnishes the principal income, but the source of income on most farms is from potatoes and rye.

Corn is usually grown on sod land, and about 75 per cent of the breaking is done in the spring. Most of the land is then harrowed

twice with the disk, acme, or spring-tooth harrow, then with a spike-tooth harrow once, and the plank drag is used once just before planting.

TABLE XII.—*Tillage practices with corn in Mercer County, N. J., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 7 and 9 to 13 the figures show the order in which the implement was used on the several farms: as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.						Tillage after planting.								Normal yield per acre (bushels).
		Harrow.				Plank drag.	All workings.	Spike-tooth harrow.	Weeder.	Cultivator.			Total cultivations.			
										2-horse.		1-horse 5-shovel.	Harrow, weeder, or roller.	Other implements.	All workings.	
		Disk.	Acme.	Spring-tooth.	Spike-tooth.					8-shovel.	With sweeps for ridging.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	8	1			2	3	3			1,2,3	4,5			5	5	40
2	8	2,3			1	4	4		1,2	3 to 6			2	4	6	50
3	7	1,2			3	4	4		1,2	3 to 7			2	5	7	65
4	5		1,2		3	4	4		1	2 to 6			1	5	6	60
5	6	1,2			3	4	4			1,2	3,4			4	4	40
6	8	1,2	3		4		4		2	1,3,5 to 8		4	1	7	8	50
7	8	1		2	3		3			1 to 4	5,6			6	6	50
8	6	1,2			3,4	5	5			1 to 4		5		5	5	40
9	7	1,2			3		3			1 to 4		5,6,7		7	7	50
10	6				1,2		2			1 to 4	5,6	7,8		8	8	60
11	5	1,2			3	4	4			1 to 5				5	5	38
12	5			2,3	4	a 1	4	1		2 to 5		6	1	5	6	50
13	5			1	2		2			1 to 4	5,6			6	6	40
14	7	1		2	3	4	4	1	3	2,4,5			2	4	6	45
15	7	1,2	3		4		4			1 to 6				6	6	50
16	7	1		2	3	a 4	4	1		2	4	3,5,6	1	5	6	80
17	8	1,2			3,4		4	1		2 to 5		6,7	1	6	7	50
18	7			1	2		2	1		2 to 6			1	5	6	50
19	6		1,2		3	4	4		1	2,3,4		5,6	1	5	6	70
20	7	2	1		3	4	4	1,2		3,4,5		6,7	2	5	7	60
21	7	1		2	3		3			1,2	3,4	5,6		6	6	50
22	4½			1,2	4	3	4	1		2 to 5		6,7	1	6	7	50
23	4½			1	2	3	3			1 to 5				5	5	50
24	8	1–4		5			5			1 to 3		4		4	4	60
25	6	1			3	2	3		1	2 to 5			1	4	5	40
26	8	1			2	3	3			1 to 4		5		5	5	75
27	6			1,2	3	4	4			2 to 5	6	1		6	6	40
28	6	1		3		2	3	1	3	2 to 7			2	5	7	42
29	5			1	2		2			1 to 4	5	6		6	6	
30	4	1	2		3	4	4			1 to 5				5	5	50
31	4				1,2		2	1		2 to 5			1	4	5	50
32	6	1,2			3		3			1,2,3	4,5			5	5	40
Farms using..per cent..		65.6	18.7	40.6	93.7	59.4		28.1	25.0	100	31.2	46.8	53.1			
Average	6.3						3.5							5.3	5.9	51.1

a Roller.

Nearly all the corn is planted level and about 70 per cent in checks $3\frac{2}{3}$ to 4 feet apart each way, with three kernels per hill. About 50 per cent of the planting is done with a hand planter and the rest with the 2-horse 2-row planter. After planting, about 50 per cent of the farms

use a weeder (fig. 24) or spike-tooth harrow for the first cultivation, and for the next four or five cultivations the 2-horse 8-shovel cultivator is mostly used. The 1-horse 5-shovel 1-row cultivator (fig. 25) is often used for the last cultivation. A 2-horse potato plow having four long sweeps and designed for ridging the land is often used for the last cultivation.

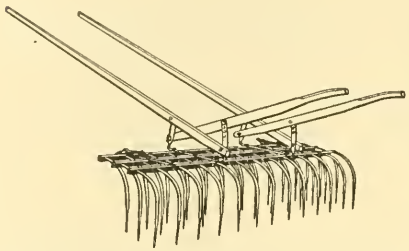

FIG. 24.—A weeder used for the first cultivation of corn.

About 35 per cent of the farmers grow crimson clover and rye or vetch as cover crops after corn.

The principal varieties of corn grown are of the yellow dent type, but some white dent is grown.

The most prevalent weeds are crab-grass, smartweed, nut-grass, Canada thistle, ragweed, and purslane.

SURVEYS IN MOULTRIE COUNTY, ILL.

The tillage records for Moultrie County, Ill., were taken near Lovington, which is in the prairie region. (Table XIII.) This section is exceptionally level. The farms are divided into uniform fields,

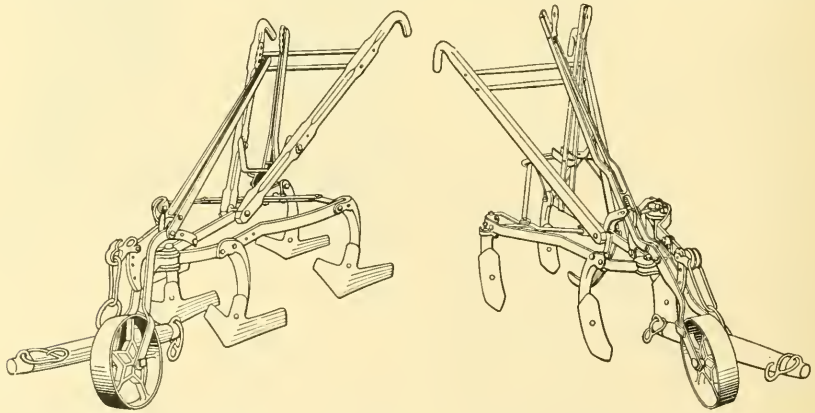

FIG. 25.—A 1-horse 5-shovel corn cultivator; at left with sweeps attached, at right with shovels.

which are well fenced. The farmers appear to be very prosperous, with exceptionally good houses and outbuildings, but only a few of the roads have been improved and hauling is very difficult during wet weather.

The soil is a very dark-colored sticky clay, known as the prairie-loam type, which cakes easily and becomes extremely hard in dry weather, frequently cracking badly. It is very fertile, and practically no commercial fertilizer is used. Nearly all the cultivated

land in this section is tile drained and the farmers have cooperated in establishing central drainage systems to dispose of the drainage water.

TABLE XIII.—*Tillage practices with corn in Moultrie County, Ill., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 5 and 7 to 12 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.				Tillage after planting.									Normal yield per acre (bushels).
		Harrow.						2-horse cultivator.				Total cultivations.			
		Spike-tooth.	Disk.	Roller.	All workings.	Harrow.	Roller.	6-shovel.	4-shovel.	Surface.	Disk (fig. 27).	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	5	1	2,3	....	3	2	1	.....	3,4,5	.....	.....	2	3	5	55
2	5	3	1,2	4	4	1,3	2	4 to 7	.....	.....	.....	3	4	7	50
3	4	3	1	2	3	1	....	4	a 2,3	.....	.....	13	3	4	50
4	5	1,4	2,3	....	4	1	....	2,3	.....	4	.....	1	3	4	50
5	4	3	1	2	3	1	....	2,3	.....	.....	4	1	3	4	45
6	5	1	.....	2	2	2	1	3,4,5	.....	.....	.....	2	3	5	50
7	6	3	1,2	....	3	....	....	1 to 4	.....	.....	.....	0	4	4	60
8	5	.....	1,2	....	2	1	....	2,3,4	.....	.....	.....	1	3	4	50
9	4½	2	1	3	3	1,3	2	5	.....	4,6	.....	3	3	6	48
10	5	1,2	3	....	3	....	....	1,2,3	.....	.....	.....	0	3	3	45
11	6	3	1,2	....	3	2	1	.....	.....	3,4,5	.....	2	3	5	45
12	6	3	1,2	....	3	1	....	2 to 5	.....	.....	.....	1	4	5	45
13	5	1	2,3	....	3	1	....	2,3	.....	.....	.....	1	2	3	40
14	5	3	1,2	....	3	1	....	2,3,4	.....	.....	.....	1	3	4	45
15	6	3	1,2	....	3	1	2	3 to 6	.....	.....	.....	2	4	6	35
16	5	3	1,2	....	3	1	....	.....	.....	.....	2,3,4	1	3	4	55
17	7	1,4,5	2,3	....	5	....	1	2,3,4	.....	.....	.....	1	3	4	75
18	6	1,4	2,3	....	4	....	1	2,3,4	.....	.....	.....	1	3	4	55
19	6	.....	1	....	1	1	....	3,4,5	.....	2	.....	1	4	5	50
20	6½	1	3	2	3	1	....	2,4	.....	3,5	.....	1	4	5	.....
21	7	3	1,2	4	4	....	1	2,3,4	.....	.....	.....	1	3	4	55
22	5	4,5	1,2,3	....	5	1	....	2,3,4	.....	.....	.....	1	3	4	40
23	7	2	1	....	2	1	....	2 to 5	.....	.....	.....	1	4	5	50
24	5	3	1,2	....	3	....	....	1,2,3	.....	.....	.....	0	3	3	50
25	5½	2,4	.....	1,3	4	2	1	.....	.....	3,4,5	.....	2	3	5	45
Farms using, per cent	.....	92	92	32	....	76	44	84	8	24	8	88	.....	.....	.....
Average	5.4	.....	.....	....	3.2	....	....	.....	.....	.....	.....	.....	3.2	4.4	49.5

a Eight-shovel cultivator.

The farmers in this county generally practice a rotation of corn two years, oats one year, wheat one year, and clover one year. Frequently wheat is omitted from the rotation and clover is seeded with oats. Still more frequently corn is grown for a number of years on the same land without any rotation. Very little fruit or truck is grown in this section and the corn crop is the principal source of income. Some cattle and hogs are sold.

The fields are usually laid off in 40-acre squares and the breaking is done largely with 3 and 4 horse sulky plows. Generally large Percheron mares are worked on the farms and the geldings are sold

for the city trade. These mares average about 1,400 pounds in weight, which permits the use of large implements and requires little man labor.

After the land is broken the seed bed is usually prepared with a 4-horse disk harrow, followed by a corrugated roller (fig. 26), and

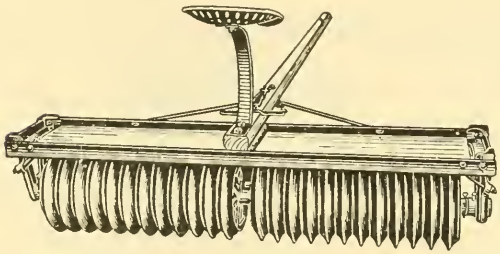

FIG. 26.—A corrugated roller or pulverizer, an implement used in Moultrie County, Ill., and other sections of the Middle West.

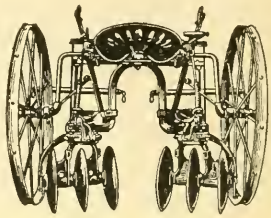

FIG. 27.—A 2-horse disk cultivator used in cultivating corn in Moultrie County, Ill.

this is followed by a spike-tooth harrow. This leaves the land practically level and in very fine conditino. Planting is done in most cases with a 2-row edge drop planter in checks 3½ feet apart each way, alternating the hills with two and three grains.

While the corn is coming up, or right after it gets up, the field is harrowed once or twice with a spike-tooth smoothing harrow. If the field is cloddy, a corrugated roller is used before the harrow. After this harrowing most of the cultivating is done with a 2-horse 6-shovel cultivator or a 2-horse disk cultivator (fig. 27). Usually three or four cultivations are given in alternate directions. A type of implement known as the surface cultivator (fig. 28) is frequently used, especially for the last cultivation. This implement, instead of having shovels, is equipped with four long sweeps, which are very similar to the knives of a stalk cutter. These sweeps run two on either side of the row and about 1 inch deep. They are set at an angle to the soil of about 45°. The sweeps cut off and destroy the weed growth much more effectively than do the shovels.

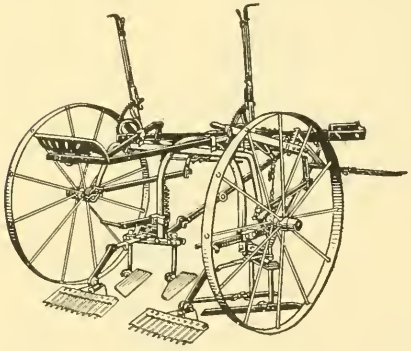

FIG. 28.—A type of surface cultivator equipped with four long sweeps for stirring the soil, used for corn tillage in Moultrie County, Ill., and other sections of the Middle West.

Practically no cover crops are grown in this region. Both the white and yellow dent varieties of corn are grown. The principal troublesome weeds for this section are foxtail, smartweed, cocklebur, morning-glory, and buttonweed.

SURVEYS IN TAMA COUNTY, IOWA.

Tama County is located in east-central Iowa and is a typical corn-growing region. The soil is principally of the silt-loam type and is very productive. The country generally is gently rolling, but some parts of this county are rather hilly. This rolling condition with a loamy type of soil affords good natural drainage except in the bottoms, which are practically all tile drained. The land is usually not too steep for the profitable use of improved machinery. (Table XIV.)

TABLE XIV.—*Tillage practices with corn in Tama County, Iowa, showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3, 4, and 6 to 9 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation; 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.			Tillage after planting.							Normal yield per acre (bushels).
		Harrow.		All workings.	Spike-tooth harrow.	2-horse.			Total cultivations.			
						Cultivator.						
		Disk.	Spike-tooth.			6-shovel.	Disk.	Weeder.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	5	3	1,2,4	4	1,2	3,4,5	.....	.....	2	3	5	45
2	5	2	1,3	3	1	2 to 5	.....	.....	1	4	5	40
3	5	3	1,2,4	4	1,2	3,4,5	.....	.....	2	3	5	45
4	4	1	2	2	.....	4,5	.....	1,2,3	3	2	5	65
5	5	1,2	3,4	4	1,2	3 to 6	.....	.....	2	4	6	63
6	5	1	2,3,4	4	1,2	3,4,5	.....	.....	2	3	5	60
7	4	1,2	3	3	1,2	3 to 6	.....	.....	2	4	6	45
8	5	3	1,2	3	1,2,3	4 to 7	.....	.....	3	4	7	40
9	5	3	1,2	3	1,2,3	4,5,6	.....	.....	3	3	6	45
10	5	1,2	3,4	4	1,2	3,4,5	.....	.....	2	3	5	45
11	5	.....	1,2	2	1,2	3 to 6	.....	.....	2	4	6	35
12	6	1	2	2	1,2	3,4,5	.....	.....	2	3	5	48
13	6	1	2	2	1,2	3 to 6	.....	.....	2	4	6	30
14	4	1	2	2	1,2	3 to 6	.....	.....	2	4	6	35
15	6	1	2,3	3	1,2	3 to 6	.....	.....	2	4	6	45
16	5	1,2	3,4	4	1	2,3,4	.....	.....	1	3	4	20
17	4	1	2	2	1,2	3,4	5	.....	2	3	5	40
18	6	1,2	3,4	4	1,2	3 to 6	.....	.....	2	4	6	50
19	4	1	2,3	3	1,2	3,4,5	.....	.....	2	3	5	45
20	3	.....	1,2	2	1,2	3 to 6	.....	.....	2	4	6	50
21	5	1	2,3	3	1,2	3,4,5	.....	.....	2	3	5	55
22	7	1,2	3	3	1,2	3,4,5	.....	.....	2	3	5	30
23	4	1	2	2	.....	1 to 4	.....	.....	0	4	4	40
24	6	1	2	2	1	2,3,4	.....	.....	1	3	4	40
25	6	1,2	3,4	4	1,2	3 to 6	.....	.....	2	4	6	60
Farms using, per cent	.....	92	100	.....	92	100	4	4	96	.....	.....	.....
Average	5.1	.....	.....	3	.....	.....	.....	.....	.....	3.4	5.3	46.6

The county generally appears very prosperous. Most of the leading roads have been improved, good schools are maintained, and exceptionally good farmhouses and barns are found. Almost universally the farmhouses are painted white and the barns red.

Almost half the farms are operated by tenants, and usually a cash rent is paid. The average-sized farm is 148.8 acres, with 109.7 acres cultivated, not including the pasture lands. No definite rotations are practiced. The principal crops grown are corn, oats, and hay, with some little wheat. A general rotation of corn two years, oats one year, and hay and pasture two years is practiced to some extent. Not enough fruit is produced to supply home demands. Sweet corn is grown by most farmers living near Toledo, to supply the canning factory located there. Bluegrass does well in this section and pastures are maintained on most farms. Most of the grain grown in this section is fed on the farms to beef cattle and hogs. Some colts are raised and a few farmers keep sheep. The principal source of farm income is from the sale of live stock.

In preparing land for corn heavy teams are generally used. Most of the breaking is done in the spring with a 3-horse sulky plow. Where corn follows sod often a part of the land is broken in the fall. After plowing, the land is usually harrowed with a disk harrow and then just before planting harrowed twice with a spike-tooth harrow. Corn is planted level and a 2-horse 2-row planter is used. The rows are generally 3½ feet apart each way and the hills alternate with two and three grains. The cultivation methods after planting are exceptionally uniform. The corn is harrowed with a spike-tooth harrow before and just after coming up. Then three or four cultivations are given with a 2-horse 6-shovel riding cultivator. Practically no cover crops are grown, and no fertilizer is used other than stable and barnyard manure. Both the yellow and white varieties of dent corn are grown.

The most prevalent weeds in this section are foxtail, bindweed, pigweed, ragweed, smartweed, and cocklebur.

SURVEYS IN KALAMAZOO COUNTY, MICH.

Where the tillage records for Michigan were taken in southern Kalamazoo County, principally around Schoolcraft, the country is level and is known as the prairie section.

This region is prosperous and on most farms are found exceptionally good farmhouses and good outbuildings. Most of the principal roads have been graveled or macadamized. Since the land is practically level the farmers are enabled to have uniform-sized fields and to use improved machinery to advantage. (Table XV.) The soil consists of a dark brown to black loam from 12 to 16

inches deep. The subsoil is of a heavier clay loam to a depth of 3 feet, which is underlain with beds of sand and gravel, affording good natural drainage, which makes tiling unnecessary.

In this region a type of general farming is practiced, with the farm income principally from grain and hogs. A rotation of corn one year, oats one year, wheat one or two years, and hay one year is maintained to some extent, but only a few farms have definite rotations. Very little truck is grown except around Kalamazoo, where numerous muck beds are found. These are principally used for growing celery. A few cattle are kept and the manure is usually applied broadcast to the sod land before breaking for corn. Practically no commercial fertilizer is used.

TABLE XV.—*Tillage practices with corn in Kalamazoo County, Mich., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 6 and 8 to 11 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.					Tillage after planting.							Normal yield per acre (bushels).
		Harrow.			Roller.	All workings.	Spike-tooth harrow.	Roller.	Cultivator, 2-horse.		Total cultivations.			
		Spring-tooth.	Spike-tooth.	Disk.					6-shovel.	Spring-tooth.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	6	1,3			2	3			1 to 5			5	5	40
2	6½	2,3			1	3			1 to 6			6	6	60
3	6	2,3			1	3			1 to 4			4	4	40
4	7	1,2,3			4	4	1		2 to 5		1	4	5	40
5	7	1,2	3		4	4			1 to 6			6	6	30
6	6½	3,4	2		1	4			1 to 6			6	6	40
7	7	2			1	2			1 to 6			6	6	35
8	7	2	4	3	1	4			1,2,3			3	3	40
9	6½	2	3		14	4			1 to 5			5	5	40
10	7	2,3			1	3			1 to 5			5	5	55
11	6	2,3	4		1	4	1		2 to 5		1	4	5	40
12	7	1,2,3			4	4			1 to 4			4	4	38
13	7	1,3			2	3			1 to 4			4	4	40
14	7	1	3		24	4			1 to 4			4	4	35
15	7	1,3	4		25	5			1 to 4			4	4	40
16	7	2	3		1	3		2	1 to 6		1	5	6	40
17	7	1,2			3	3	1		2,3		1	2	3	42
18	6	1	2			2		a1		2 to 7	1	6	7	42
19	7	1	2		3	3			1 to 5			5	5	40
20	6	1	3		24	4	1		2 to 5		1	4	5	40
21	6	2,3	4		1	4			1 to 5			5	5	38
22	6	2	3		a1	3	1		2 to 6		1	5	6	40
23	7	2	3		1	3			1 to 7			7	7	55
24	7	2			1	2		2	1 to 6		1	5	6	50
25	7½	2,3			1	3		2	1,3 to 6		1	5	6	40
26	6	2,3			1	3			1,3 to 4			4	4	40
Farms using, per cent		100	53.8	3.8	96.2		19.2	15.4	96.1	3.8	34.6			
Average.	6.7					3.3						4.7	5.0	41.5

a Plank drag.

The tillage practices with corn, which is the only intertilled crop, are very uniform. Practically all the corn land is broken in the spring with 3 or 4 horse sulky plows. The common practice of preparation is to roll the land just after plowing and to follow the roller with a spring-tooth harrow. Then before planting, it is harrowed again with a spike-tooth harrow. Practically all the corn is planted level and in checks $3\frac{2}{3}$ feet apart each way, alternating the hills with two and three grains.

After the corn is up a few of the farmers use the spike-tooth harrow for the first working, but practically all the cultivating is done with a 2-horse 6-shovel cultivator, alternating the cultivations with the rows and across the rows with the checks. Usually five cultivations are given. Both the white and yellow dent varieties of corn are grown.

The most prevalent weeds are foxtail, pigweed, Canada thistle, ragweed, and curled dock.

SURVEYS IN MAURY COUNTY, TENN.

The tillage records (Table XVI) for Maury County, Tenn., were taken near Columbia. This section is rolling and in some parts extremely rough and rocky. Considerable quantities of phosphate rock are mined near Columbia, and limestone is plentiful. The Hagerstown loam, the predominating soil in this vicinity, is very productive.

Most of the farms through the more prosperous sections are rather large, with extensive fields, and are generally operated by the owners with hired labor or tenants. The principal roads have been macadamized and the country generally is prosperous.

Few farms have any set rotations, but a rotation of corn one year, oats one year, wheat one or two years, clover one year, and pasture one year is maintained to some extent. Very little fruit or truck is grown, and the principal sources of income are grain, hogs, and cattle.

The extensive type of farming found here, together with the cheap labor available, is responsible for the irregular methods of corn cultivation. Before planting, the land is usually harrowed twice with a disk harrow and once with a spike-tooth harrow. Most of the corn is planted level and in drills.

After the corn is up it is usually harrowed with a spike-tooth harrow. After this, most of the cultivating is done with a 2-horse 4-shovel cultivator and a 1-horse spike-tooth cultivator. Usually four or five cultivations are given. Crimson clover and rye are frequently sown at the last cultivation as a cover crop. Both the yellow and white varieties of dent corn are grown.

TABLE XVI.—*Tillage practices with corn in Maury County, Tenn., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 6 and 8 to 17 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.					Tillage after planting.												Normal yield per acre (bushels).
		Harrow.			Roller.	All workings.	Spike-tooth harrow.	Weeder.	1-horse 1-shovel plow.	Cultivator.							Total cultivations.		
		Disk.	Spike-tooth.	Acme.						1-horse 5-shovel.	2-horse disk.	3-horse 6-shovel 2-row.	2-horse 4-shovel.	1-horse spike-tooth.	1-horse 2-shovel.	2-horse 8-shovel.	Harrow, weeder, or roller.	Other implements.	All workings.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	9	1,2	3	....	....	3	1	3	....	....	....	....	2,4	5,6,7	....	....	2	5	7	50
2	7	1,2	....	....	....	2	1,3,4	....	2	....	....	....	5,6,7	8	....	....	3	5	8	50
3	7	1	2	....	....	2	....	....	4	1	2	....	3,5	6	....	....	....	6	6	38
4	8	1	....	....	....	1	1	....	....	....	....	....	2,3,4	5	....	....	1	4	5	30
5	8	1,2	....	....	....	2	1	....	....	....	....	....	2	3 to 6	....	....	1	5	6	40
6	7	1,2	3	....	....	3	1	....	....	....	....	....	....	4,5,6	2,3	....	1	5	6	36
7	10	1,2	....	3	....	3	1,2	....	....	....	....	....	....	3,5,6,7	4	....	2	5	7	40
8	6	1	2	....	....	2	1	....	....	....	....	....	2,3	....	....	4,5	1	4	5	40
9	7	1	2	....	....	2	1	....	....	....	....	....	2,3	4,5	....	....	1	4	5	40
10	7	1,2	3	....	....	3	1	....	....	....	....	2,3	....	4	....	....	1	3	4	35
11	6	1,2	3	....	....	3	1	....	....	....	....	....	2,3	4,5	....	....	1	4	5	50
12	7	1,2	3	....	....	3	a 1	....	2	....	....	....	3,4,5	....	....	....	1	4	5	50
13	8	1,2	3,4	....	5,6	6	....	....	....	....	....	....	1	2 to 5	....	....	....	5	5	40
14	7	1	2	....	....	2	....	....	....	....	....	....	1 to 4	....	....	....	....	4	4	50
15	12	1 to 4	....	....	....	4	....	....	1	....	....	....	....	2,3	....	....	....	3	3	25
Farms using, per cent	....	100	66.7	6.7	6.7	....	73.4	6.7	26.7	6.7	6.7	6.7	73.4	80.0	13.4	6.7	73.4	....	....	....
Average.	7.7	....	....	....	....	2.7	....	....	....	....	....	....	....	....	....	....	....	4.4	5.4	40.9

a Roller.

The principal weeds found in this section are crab-grass, smartweed, cocklebur, pigweed, morning-glory, and thistles.

SURVEYS IN HARTFORD COUNTY, CONN.

The tillage records for Hartford County, Conn., were taken around Hartford, South Manchester, and throughout the Connecticut Valley region, where we find mostly tobacco farms. Enough truck and dairy farms are operated to supply the local market, but the principal sources of farm income are tobacco and fruit.

The country generally is level or gently rolling and the soil is very fertile. (Table XVII.) Practically all the farms are worked by the owners. Most of the farmers have good homes, with unusually good barns and outbuildings. All the principal roads have been macadamized. Good schools are maintained and the country is exceptionally prosperous.

The soil is mostly of a sandy-loam type with a sandy-loam subsoil. The low lands contain more clay. The land is so rolling that tile drains are not usually necessary.

TABLE XVII.—*Tillage practices with corn in Hartford County, Conn., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 6 and 8 to 14 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.					Tillage after planting.										Normal yield per acre.[a]
		Harrow.			Plank drag.	All workings.	Spike-tooth harrow.	Weeder.	Cultivator.					Total cultivations.			
									1-horse. Once to row.		2-horse.						
		Acme.	Disk.	Spike-tooth.					Spike-tooth.	5-shovel.	8-shovel.	6-shovel.	1-row with scraper.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	6	....	1,2	3	....	3	....	.....	.....	.....	1	.....	.....	....	1	1	40
2	7	....	1,2	....	....	2	1	2	.....	.....	3,4,5	.....	.....	2	3	5	45
3	8	2	1	....	....	2	....	1,2	.....	.....	3,4,5	.....	6	2	4	6	40
4	7	2	1	....	....	2	1	.....	.....	.....	.....	2,3	4	1	3	4	50
5	10	1,2	3	....	....	3	....	1,2,3	.....	.....	.....	4,5	.....	3	2	5	T 20
6	8	1	2	3	....	3	....	1,2	3	.....	.....	4,5	.....	2	3	5	T 15
7	7	....	1,2	3	....	3	....	1,2	3	.....	.....	.....	4	2	2	4	50
8	7	....	.....	1,2	3	3	....	.....	3,4	1,2	.....	.....	.....	....	4	4	40
9	9	1,2	....	3	....	3	....	1	2,3	.....	.....	.....	4	1	3	4	20
10	7½	....	1,2	3	....	3	....	.....	1,2	.....	.....	.....	.....	....	2	2	40
11	7	1	2	....	....	2	....	.....	.....	1 to 4	.....	.....	.....	....	4	4	17
12	7	....	1,2	3	....	3	....	1	.....	2,3	.....	.....	4	1	3	4	37
13	6	....	1	2	....	2	....	.....	1	.....	.....	.....	2,3	....	3	3	45
14	8	1	2	....	....	2	....	.....	1,2	.....	.....	.....	3	....	3	3	T 17
15	6	....	2	1	....	2	....	.....	1 to 4	.....	.....	.....	5	....	5	5	40
16	7	....	.....	1,2	....	2	....	.....	1,2	.....	.....	.....	3,4	....	4	4	33
17	7	1	....	2	....	2	1,2	.....	.....	3,4	.....	.....	5,6	2	4	6	50
18	8	....	1	2	....	2	....	.....	.....	.....	1,2,3	.....	.....	....	3	3	45
19	7	....	1	2	....	2	1	.....	.....	.....	2,3	.....	.....	1	2	3	30
20	7	1	....	2	....	2	....	1	.....	.....	.....	2,3	.....	1	2	3	T 12
21	8	....	1,2	3	....	3	....	1,2	.....	.....	3,4	.....	.....	2	2	4	60
22	7	....	1	2	....	2	....	.....	1,2,3	.....	.....	.....	4	....	4	4	33
23	8	....	1,2	....	....	2	1	2	.....	.....	.....	.....	3	2	1	3	35
24	8	....	1,2	3	....	3	....	.....	1,2	.....	.....	.....	3	....	3	3	37
25	7	....	.....	1,2	3	3	....	.....	1,2	.....	.....	.....	3,4	....	4	4	50
Farms using, per cent	....	36	76	72	8	....	20	40	48	16	24	16	56	52	....	....	.....
Average	7.4	....	....	....	....	2.4	....	.....	.....	.....	.....	.....	.....	....	3	3.8	39.9

[a] Yields are given in bushels except those marked "T," which are tons of ensilage.

No general rotation is practiced and tobacco is often grown on the same land for 20 years without a change. Usually enough corn and hay is grown to supply home demands. A large part of the corn is grown on sod land. Most of the breaking is done in the spring with a 2-horse plow. This land is very easy to get into good condition. After plowing, the land is usually harrowed once or twice with a disk or acme harrow and then once with a spike-tooth harrow.

Practically all the corn is planted level and mostly in drills 3½ feet apart, with hills 2 or 3 feet apart in the drill and three or four stalks per hill. Chiefly the yellow flint varieties of corn are grown.

After planting, either a spike-tooth harrow or weeder is frequently used for the first cultivation. The 1-horse spike-tooth (fig. 29) and the 1-horse 5-shovel cultivators are extensively used. The 2-horse 8-shovel and 6-shovel cultivators are also considerably used.

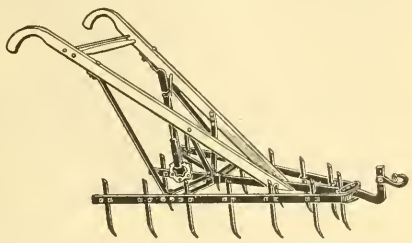

FIG. 29.—A 1-horse spike-tooth cultivator.

A special 2-horse cultivator, equipped with sharp scrapers or knives for cutting the weeds and stirring the surface of the soil, is largely used (fig. 30). This cultivator was designed for cultivating tobacco, and the knives are so adjusted that they will extend under the leaves and cultivate near the stalk without breaking or bruising the leaves. As shown in Table XVII there is little uniformity in the cultivation methods in this section.

Practically no cover crops are grown, and the supply of organic matter is largely maintained by stable manure secured from the cities. Immense quantities of commercial fertilizers are used for corn and tobacco, and about 15 tons of stable manure per acre are applied to the tobacco land every other year. Very little stable manure is applied to the corn land, however.

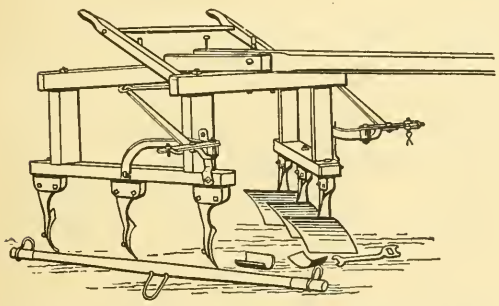

FIG. 30.—A 2-horse cultivator with scraper instead of shovels, used in cornfields in Hartford County, Conn., and in the potato sections of New Jersey.

The most prevalent weeds are ragweed, chickweed, pigweed, smartweed, wild carrot, and barnyard grass.

SURVEYS IN BRADFORD COUNTY, PA.

The tillage records for Bradford County, Pa. (Table XVIII), were taken near Towanda, in the Volusia silt-loam area, which covers a large part of northern Pennsylvania, northeastern Ohio, and southern New York. The soils of this region are naturally divided into two main groups, upland or hill soils and the bottom-land soils. The hill or upland soils are extremely rough and rolling and are not usually very productive. The bottom-land soils are level and very fertile.

None of the upland and only a small percentage of the bottom land is tile drained. A few of the leading valley roads have been macadamized. The valley farms usually have good buildings and show signs of prosperity, but the hill farms are not so productive. But few tenants are found in this section.

TABLE XVIII.—*Tillage practices with corn in Bradford County, Pa., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 6 and 8 to 13 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.					Tillage after planting.									Normal yield per acre.[a]
		Harrow.			Roller.	All workings.	Weeder.	Cultivator.					Total cultivations.			
		Spring-tooth.	Disk.	Spike-tooth.				2-horse 8-shovel.	2-horse 6-shovel.	1-horse 5-shovel, once to row.	1-horse 2-shovel.	2-horse 1 row, with scraper.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	7	1,2				2		1,2,3						3	3	50
2	6	1,2				2				1 to 5				5	5	25
3	5	1	2			2				1 to 6				6	6	T 10
4	6	1,2,3		4		4			1 to 5					5	5	T 8
5	7	1,2,3				3			2 to 5	1				5	5	25
6	7	1,2,3				3				1,2	3			3	3	40
7	6	1 to 4				4	b 1			2 to 5			1	4	5	50
8	6	1,2,3				3			1,2,3					3	3	T 7
9	7	1		2		2				1 to 4		5		5	5	25
10	6	1,2,3		5	c 4	5			1 to 5		6			6	6	40
11	7	1,2,3				3				1,2,3				3	3	T 12
12	6	1,2				2				1 to 6				6	6	40
13	6	1				1				1 to 8				8	8	40
14	5	1,2,3				3				1 to 4				4	4	40
15	6	1 to 4				4				1 to 7				7	7	40
16	7	1,2,3				3			1 to 5					5	5	T 12
17	8	1,2,3				3				1 to 6				6	6	T 10
18	7	1		2		2			1 to 4	5				5	5	50
19	7	1		2		2		1,2						2	2	25
20	4	1,2				2				1,2				2	2	30
21	8	1				1	1,2,3			4			3	1	4	T 12
22	3	1,2				2				1,2,3				3	3	30
23	6	1,2		3		3			2,3	1				3	3	50
24	5	1		2		2				1,2,3				3	3	35
25	5	1				1				1,2,3		4		4	4	37
26	6	1,3,4			2	4	1		2,3,4				1	3	4	50
27	7	1				1			1 to 4					4	4	40
28	6	1		2		2	b 1		2,3,4				1	3	4	40
Farms using, per cent		100	3.6	28.6	7.1		14.3	7.1	35.7	67.9	7.1	7.1	14.3			
Average	6.1					2.5								4.2	4.4	38.2

[a] Yields are given in bushels except those marked "T," which are tons of ensilage.
[b] Spike-tooth harrow. [c] Plank drag.

As a general rule the farmers have no set rotation. A rotation of corn or buckwheat one year, oats or wheat one year, and hay two or three years is somewhat practiced. On a few of the bottom farms tobacco is extensively grown. Enough dairy farms are maintained

to supply local demands. A few apples are produced, and most farmers are engaged in general farming.

A large percentage of the upland is in pasture and a considerable number of cattle are produced. Practically all the corn is grown on sod land. Most of the breaking is done in the spring with a 2-horse plow, and this is followed with the spring-tooth and spike-tooth harrows. Because the land is very stony only a few disk harrows are used.

Most of the upland farmers plant corn in drills 3 to 3½ feet apart, with one stalk every 8 inches in the drill, but in the valleys and on level uplands corn is usually planted in checks 3 to 3½ feet apart each way, with three and four stalks to the hill. In either case the planting is level.

After planting, a few of the farmers use a spike-tooth harrow or weeder for the first cultivation, but most of the cultivating is done with either a 2-horse 6-shovel cultivator or a 1-horse 5-shovel cultivator, the 5-shovel cultivator being largely used. Occasionally a 2-horse 8-shovel cultivator and a 1-horse 2-shovel cultivator are found. On the tobacco farms a special cultivator similar to that used in the Connecticut Valley tobacco district is used. This is a 2-horse cultivator equipped with scrapers or knives for stirring only the surface soil and cutting the weeds. It is so adjusted that the knives extend under the tobacco leaves and cultivate near the stalk without breaking or bruising the leaves. Few cover crops are grown, and corn land is usually seeded to oats in the spring.

Both the flint and dent varieties of corn are grown, but the dent is largely used for ensilage.

The most prevalent weeds are ragweed, smartweed, pigweed, and wild carrot.

SURVEYS IN CHRISTIAN COUNTY, KY.

Most of the tillage records for Kentucky (Table XIX) were taken in southern Christian County, in the section around Pembroke. This is a level prairielike section with very fertile soil of a silt-loam type. This soil has good natural drainage, and ordinarily no tiles or surface drains are found.

Practically all the leading roads have been macadamized. The farmers have exceptionally good houses and appear prosperous. Mostly negro labor is employed on the farms, which are large, but since cheap labor is available very little improved machinery is employed.

A general rotation of corn or tobacco one year, wheat two years, and hay two years is maintained to some extent on most farms. Cowpeas are grown for hay in this section and as a catch crop are often sown in corn at the last cultivation.

The principal farm incomes are from wheat, hay, tobacco, and hogs. Most of the corn is fed on the farm. Very little fruit or truck is grown except for the local market.

TABLE XIX.—*Tillage practices with corn in Christian County, Ky., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 5 and 7 to 12 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.				Tillage after planting.									Normal yield per acre (bushels).
		Harrow.				Cultivator.						Total cultivations.			
		Disk.	Spike-tooth.	Roller.	All workings.	Spike-tooth harrow.	1-horse spike-tooth, once to row.	2-horse, 1-row, 4-shovel.	2-horse, 1-row, 8-shovel.	1-horse, 2-shovel, twice to row.	1-horse turning plow, twice to row.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	9	1,2	3,4	....	4	1	.....	.....	2,3,4	.....	.....	1	3	4	20
2	7	1,2	3	....	3	1	4,5,6	.....	2,3	.....	.....	1	5	6	25
3	7	1	....	....	1	1	2,3,4	.....	.....	.....	.....	1	3	4	40
4	6	1	2	....	2	....	3,4	.....	.....	1,2	.....	....	4	4	35
5	8	1,2	3	....	3	....	1 to 4	.....	.....	.....	.....	....	4	4	40
6	8	1,2	3	....	3	1,2	3 to 7	.....	.....	.....	.....	2	5	7	50
7	7	1,2	3	....	3	1	4 to 7	.....	.....	2,3	.....	1	6	7	40
8	7	1,2	3	....	3	1	.....	.....	.....	2 to 5	.....	1	4	5	40
9	8	1,2	3	....	3	1	4	.....	.....	.....	2,3	1	3	4	40
10	8	1,2	4	3	4	....	3,4	1,2	.....	.....	.....	....	4	4	40
11	6	1 to 4	5	....	5	....	.....	1 to 4	.....	.....	.....	....	4	4	40
12	6½	1,2	3	....	3	1	6	.....	.....	2 to 5	.....	1	5	6	40
13	4	1 to 4	5	....	5	1,2	.....	3,4	.....	.....	.....	2	2	4	35
14	8	1,2	3	....	3	1	2 to 5	.....	.....	.....	.....	1	4	5	30
15	7	1	....	....	1	1	.....	2,3,4	.....	.....	.....	1	3	4	40
16	7	1,2	3	....	3	1,2	8	.....	7	3 to 6	.....	2	6	8	30
17	7	1	2	....	2	1	.....	2,3,4	.....	.....	.....	1	3	4	40
18	6	1,2	3	....	3	1	.....	.....	.....	2,3,4	.....	1	3	4	35
19	12	1,2,3	....	....	3	....	.....	.....	.....	1,2,3	.....	....	3	3	35
20	7	1	....	....	1	....	5,6,7	.....	.....	3,4	1,2	....	7	7	40
21	6	1	2	....	2	1	4,5	.....	.....	2,3	.....	1	4	5	30
22	6	1,2	....	....	2	1	2 to 6	.....	.....	.....	.....	1	5	6	30
23	6	1,2	3	....	3	1	4 to 7	.....	.....	.....	2,3	1	6	7	50
24	8	1,2,3	4	5	5	....	1 to 5	.....	.....	.....	.....	....	5	5	40
25	7	1,2	4	3	4	....	5,6	.....	.....	.....	1 to 4	....	6	6	40
26	7	1	3	2	3	[a]1	2 to 6	.....	.....	.....	.....	1	5	6	35
Farms using, per cent	....	100	80.7	15.4	....	69.2	69.2	19.2	11.5	34.6	15.4	69.2	....	....	.....
Average	7.1	.....	....	....	3	....	.....	.....	.....	.....	.....	....	4.3	5.1	36.9

[a] Roller.

This region combines the desirable conditions of the level prairie lands of the corn belt with the cheap labor conditions of the cotton belt, and the tillage methods employed here combine the practices of both sections. Corn is generally grown on sod land. Usually as much plowing is done in the fall as time and the weather will permit, and the remainder is plowed in the spring. A few farmers plow in the fall and then rebreak the land in the spring. After plowing, the land is usually harrowed twice with a disk and once

with a spike-tooth harrow. When the land is cloddy the roller is sometimes used.

Most of the corn is planted with a 2-horse 2-row planter. Some farmers plant by hand when labor is plentiful, and a few use a 1-horse planter. Seventy-three per cent of the planting is in checks from $3\frac{1}{2}$ to 4 feet apart each way, with two stalks per hill. Practically all the corn is planted level. After the corn is up it is usually harrowed with the spike-tooth harrow. After this most of the cultivating is done with a 1-horse spike-tooth cultivator and a 1-horse 2-shovel cultivator (fig. 31).

Often a 1-horse turning plow is used as a cultivator, first to plow the dirt away from the corn, which is known as barring-off, then the middles are plowed out, throwing dirt to the corn. The 2-horse 4-shovel (fig. 32) and 8-shovel cultivators are used, but not so much as the 1-horse implements. Principally because of cheap labor, the

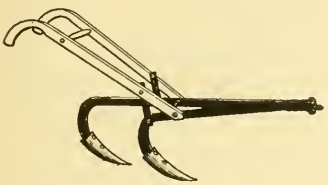

FIG. 31.—A 1-horse 2-shovel cultivator, a tillage implement in general use in cornfields in the South.

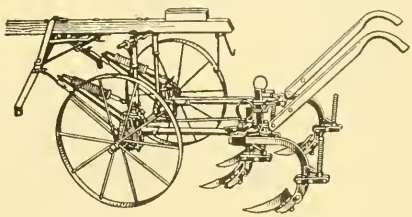

FIG. 32.—A 2-horse 4-shovel corn cultivator.

1-horse implements are largely used, and only where more expensive labor is employed is much labor-saving machinery found.

Practically no cover crops are grown. The white dent varieties of corn are principally grown. The most prevalent weeds are crabgrass, smartweed, ragweed, and wild onion.

SURVEYS IN HAMILTON COUNTY, NEBR.

Hamilton County is in the prairie section of Nebraska and practically all the land is in cultivation. The soil in this region is very fertile, but seasons are often unfavorable and crop production varies largely with the amount of rainfall. The soil is a deep black silt loam with a clay subsoil. It becomes very hard in dry weather and frequently cracks open. In the northern part of the county along the Platte River the soil is more sandy and not so productive as the silt-loam type.

This is a comparatively level region, just rolling enough to give good natural drainage and not steep enough to cause erosion or to interfere with the use of machinery. (Table XX.) There are no tile drains and practically no surface ditches or terraces.

Most of the farms are worked by the owners, and by having large fields and using heavy teams and improved machinery the minimum amount of labor is required. No definite cropping system is maintained, but usually the land is in corn for three or four years, in oats one year, and then wheat for three or four years. Some timothy and clover is grown, but most of the hay is produced from alfalfa, which does well in this region. Bluegrass does well and is often grown for pasture.

TABLE XX.—*Tillage practices with corn in Hamilton County, Nebr., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 5 and 7 to 9 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches)	Tillage after plowing and before planting.				Tillage after planting.						Normal yield per acre (bushels).
		Harrow.		Roller.	All workings.	Spike-tooth harrow.	Roller.	2-horse 6-shovel cultivator.	Total cultivations.			
		Spike-tooth.	Disk.						Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	6	1,3	2	.....	3	1	.....	2 to 5	1	4	5	40
2	5	2	1	.....	2	1	.....	2,3,4	1	3	4	30
3	5	1,3	2	.....	3	1,2	.....	3,4,5	2	3	5	30
4	7	1,3	2	.....	3	1	.....	2,3,4	1	3	4	35
5	5	1	2	.....	2	1	.....	2,3,4	1	3	4	33
6	6	1,3	2	.....	3	1,2	.....	3 to 6	2	4	6	40
7	6	1,3	2	.....	3	1,2	.....	3,4,5	2	3	5	45
8	6	1,3	2	.....	3	1,2,3	.....	4 to 7	3	4	7	45
9	5	1	2	.....	2	1,2	.....	3,4,5	2	3	5	20
10	5	1,2	.....	.....	2	1	.....	2,3,4	1	3	4	40
11	7	1,3	2	.....	3	1,2	.....	3 to 6	2	4	6	35
12	5	.....	1,2	.....	2	1,2	.....	3 to 6	2	4	6	45
13	6	1	2	.....	2	1	.....	2,3,4	1	3	4	30
14	7	1,3	.....	2	3	1	.....	2,3,4	1	3	4	40
15	6½	1	.....	.....	1	1,2	.....	3,4,5	2	3	5	30
16	5½	1,3	2	.....	3	1,2	.....	3 to 6	2	4	6	40
17	5	1	.....	.....	1	1	2	3 to 6	2	4	6	30
18	7	2,3	1	.....	3	1	.....	2,3,4	1	3	4	30
19	6	1,3	2	.....	3	1	.....	2 to 5	1	4	5	35
20	6	2	1	.....	2	1,2	.....	3 to 6	2	4	6	30
21	5	1,3	2	.....	3	1,2	.....	3,4,5	2	3	5	30
22	5	1,3	2	.....	3	1,2	.....	3,4,5	2	3	5	40
23	6	1,3,4	2	.....	4	1,2	.....	3 to 6	2	4	6	35
24	6	2	1	.....	2	1,2,3	.....	4,5,6	3	3	6	35
25	6	1	2	.....	2	1	.....	2 to 5	1	4	5	32
Farms using ...per cent	.....	96	84	4	.....	100	4	100	100	.....	.....	.....
Average	5.8	.....	.....	.....	2.5	.....	.....	.....	.....	3.4	5.1	35

A considerable number of cattle and usually from 75 to 100 hogs are kept on a farm. Practically no fruit or truck is produced, and the farm incomes are largely from hogs, grain, hay, and cattle.

The tillage practices with corn are very uniform. Usually the land is disked before plowing, which cuts up the stalks and puts the land in better condition. Practically all the plowing is done with a

4-horse gang plow (fig. 33) or a sulky disk plow (fig. 34) and the land is gone over immediately with a spike-tooth harrow. Then before planting, it is harrowed with the disk and again with the spike-tooth harrow.

Practically all the planting is done with a 2-horse 2-row planter, and the corn is planted level in checks $3\frac{1}{2}$ feet apart each way, alternating the hills with two and three grains. After the corn is up, it is harrowed once or twice with a spike-tooth harrow and then cultivated three or four times in alternate directions with a 2-horse 6-shovel cultivator.

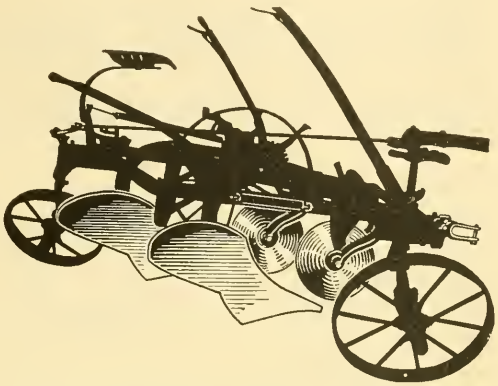

FIG. 33.—A gang plow for four or five horses, extensively used in the Central West for breaking land.

No cover crops are grown. The stable manure is largely applied to wheat, and no commercial fertilizer is used for corn.

Both the white and yellow dent varieties of corn are grown. The most prevalent weeds are foxtail, bindweed, smartweed, and pigweed.

SURVEYS IN ROCKWALL AND GRAYSON COUNTIES, TEX.

The tillage records for Texas (Table XXI) were taken in Grayson County around Sherman and in Rockwall County near Fate. The soil in these regions is of the black clay-loam type and very fertile. The land is rolling and no tile drains are necessary. Only a few surface ditches are required.

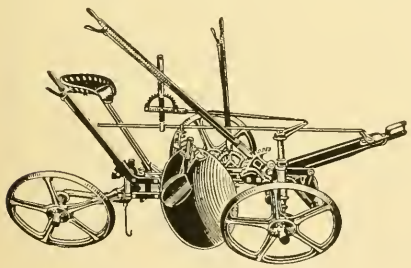

FIG. 34.—A sulky disk plow.

A few of the roads have been macadamized and others are being improved. The farms have exceptionally good houses and outbuildings, and fair schools are maintained. A considerable portion of the land is worked by tenants, but usually under the supervision of the owner. The fields are large, and 4 or 5 horse teams are commonly used. A few farmers find the traction engine economical.

The seasons are rather uncertain, and crop yields depend largely on the amount of rainfall. No general rotation is practiced, but usually corn and cotton follow small grain. Frequently cotton is grown on the same land two years in succession and then is followed

by corn. Oats and wheat are not usually grown on the same land for two succeeding years, but oats are often grown one year and wheat the next. Some fruit and truck is grown. Few cattle or hogs are kept, and the principal farm incomes are from cotton and grain. Alfalfa is grown on some of the bottom lands and does well except in dry seasons.

TABLE XXI.—*Tillage practices with corn in Rockwall and Grayson Counties, Tex., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 4 to 7 and 9 to 11 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.						Tillage after planting.						Normal yield per acre (bushels).
		Bedded as broken.	Harrow.		Rows run with lister.	Rebedded with turning plow.	All workings.	Spike-tooth harrow.	Cultivator.		Total cultivation.			
			Spike-tooth.	Disk.					2-horse 4-shovel.	2-horse 4-shovel, with sweeps.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	8	1	.....	1	*a* 2	.....	2	1,2	3,4	5,6	2	4	6	37
2	4	1	1	.....	.....	.....	1	.....	1,2	3	.....	3	3	30
3	4	1	.....	.....	*a* 1	.....	1	.....	.....	1,2,3	.....	3	3	25
4	4	1	.....	.....	.....	.....	.....	.....	1,2,3	4	.....	4	4	40
5	8	1	.....	.....	*a* 1	.....	1	.....	1	2,3	.....	3	3	30
6	8	1	.....	.....	*a* 1	.....	1	.....	.....	1,2,3	.....	3	3	30
7	7	1	.....	.....	.....	1	1	.....	1,2	3,4	.....	4	4	30
8	8	....	1	.....	*a* 2	.....	2	.....	1,2,3	.....	.....	3	3	20
9	6	....	1,2	.....	.....	.....	2	.....	1,2	3,4	.....	4	4	40
10	7	....	1	.....	.....	.....	1	.....	1,2,3	.....	.....	3	3	50
11	7	1	2	.....	1	.....	2	.....	1	2,3	.....	3	3	25
12	6	....	1	.....	2	.....	2	.....	1,2	3,4	.....	4	4	30
13	4	....	1	.....	2	.....	2	1,2	3,4,5	.....	2	3	5	40
14	8	....	1	.....	2	.....	2	.....	1,2	3,4,5	.....	5	5	40
15	4	....	1	.....	.....	.....	1	.....	.....	1,2,3	.....	3	3	20
16	5	....	1	.....	2	.....	2	.....	1	2,3,4	.....	4	4	35
17	5	....	1,2,3	.....	4	.....	4	1,2,3	.....	4,5,6	3	3	6	30
18	4	....	1,2	.....	.....	.....	2	1	.....	2 to 5	1	4	5	30
19	6	....	1,2	.....	.....	.....	2	.....	1,2	3,4,5	.....	5	5	40
20	8	....	1	.....	2	.....	2	.....	1,2	3	.....	3	3	40
21	8	....	1,2	.....	.....	.....	2	1	2,3	4	1	3	4	35
22	8	....	1	.....	.....	.....	1	.....	1	2,3,4	.....	4	4	50
23	1½	1	.....	.....	.....	.....	.....	.....	.....	1,2,3	.....	3	3	35
24	5	1	.....	.....	1	.....	1	.....	.....	1,2,3	.....	3	3	25
Farms using, per cent	....	41.6	66.7	4.2	54.2	4.2	....	20.8	70.8	87.5	20.8	.....	.....	.....
Average	6.4	....	.....	.....	.....	.....	1.5	.....	.....	.....	.....	3.5	3.9	33.6

a Lister and planter combined.

The tillage practices with corn are rather unusual. A large part of the land is broken in the fall with a 4-horse lister, or middle buster, which leaves the land in ridges the width apart the corn rows are to be. This implement (fig. 4) plows out a furrow by throwing the dirt to both sides. After ridging the land in the fall it is allowed to stand until spring without further preparation. Before planting, the ridges are usually harrowed with a spike-tooth harrow. Then

in planting a 2-horse 1-row planter is used. This planter is equipped with sweeps or a broad shovel, which tears down this ridge and makes a furrow where the ridge stood, in which the corn is planted several inches below the surface level. Practically all the corn is planted in drills 3½ feet apart with one stalk every 20 inches. Some farmers break the land level with 4-horse gangs, harrow with a spike-tooth harrow, and then lay off the rows with a lister and plant the corn in the bottom of this furrow about 4 inches below the surface level. In some of the bottoms where drainage is poor corn is planted on beds. On some of the higher lands which are inclined to be dry the land is bedded and corn planted in the water furrow between the beds.

After the corn is up, a few farmers use a spike-tooth harrow for the first cultivation, and after this practically all the cultivating is done with a 2-horse 4-shovel cultivator, using either 4-inch shovels or sweeps. For the first workings the shovels are mostly used, especially next to the corn, but sweeps may be used for the middle. At the last cultivation sweeps are mostly used and are set so that the land is leveled by the last cultivation.

The yellow dent varieties of corn are principally grown. Little commercial fertilizer is used and stable manure is not considered very valuable; it is often burned.

The most prevalent weeds are Johnson grass, Bermuda grass, pigweed, cocklebur, and nut-grass.

SURVEYS IN SCOTLAND COUNTY, N. C.

Scotland County, N. C., is a typical cotton region, being very level, with a sandy-loam soil and a clay subsoil. Only on the heavy bottom lands is tiling necessary, nor is much surface ditching required. Some open ditches are found surrounding the fields.

Most of the main roads have been improved, principally with sand and clay. Fairly good schools are maintained. The landowners have exceptionally good houses and the region appears very prosperous.

Practically all the land is owned by white men and worked under the supervision of the owners by negro tenants on a share basis, in which the tenant furnishes the labor and gets one-third the crop. In some cases the tenant furnishes the labor, half the fertilizer, half the seed, and gets half the crop. A negro man and his family, with one horse, usually work about 19 acres of cotton and 6 acres of corn.

No general rotation is practiced in this section. Corn is usually planted on the bottom lands which are too heavy for cotton and on the less fertile uplands. The principal crops grown are cotton, corn, oats, and cantaloupes. By far the most important crop is cotton, and the acreage in cotton is limited only by the labor available for picking.

TABLE XXII.—*Tillage practices with corn in Scotland County, N. C., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 4 to 11 and 13 to 19 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.										Tillage after planting.										Normal yield per acre (bushels).
		Bedded as broken.	Harrow.		Bedded with—			1-horse.			All workings.	1-horse plow.		2-horse disk harrow.	Fertilizer distributor.	1-horse sweep.	1-horse cultivator.		Total cultivations.			
			Disk.	Spike-tooth.	Turning plow.		2-horse lister.	1-shovel plow.	Cultivator.			1-shovel.	Turning.				5-shovel.	2-shovel.	Harrow, weeder, or roller.	Other implements.	All workings.	
					1-horse.	2-horse.			2-shovel.	Spike-tooth.												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	7		1					2		3	3				1,2		1 to 4			4	4	40
2	6½	1						1		2	2	1	2							2	2	20
3	8	1						1			1	1	2,5		3,4	3,4,6,7				7	7	38
4	8			1				2		3	3		1,4		3	2 to 5				5	5	40
5	6				1			2			2	1,2	3							3	3	50
6	6	1						1			1	1,2	3		4	4,5				5	5	20
7	6		1		2			3			3		1		2	2 to 6				6	6	40
8	7			1	2			3			3	1				4	2,3			4	4	25
9	4	1						1			1				1	1 to 4				4	4	35
10	7		1			2					2		1,3		3	2,4				4	4	45
11	4	1						1			1		1,3		2	2,4				4	4	15
12	8					1		2		3	3	2	1,3		3	3,4				4	4	25
13	8				1			2			2	1	4		2	2,3,5				5	5	30
14	9		2	1			3	4			4			a 1	2,3		2,3,4		1	4	5	40
15	6	1					1	2			2	1,2	3		2					3	3	40
16	5	1						1			1	1			2,5	2 to 5				5	5	20
17	8			1	2			3		4	4		1		2	2,3,4				4	4	28
18	14		1,2		3			4			4		2	1				3	1	2	3	40
19	12			1		2	3			4	4	1,4	2		4	3,5,6,7				7	7	40
20	6	1			2		1				2		4			1 to 5				5	5	40
21	8	1					1				1		1,3			2,4				4	4	50
22	5		1			2	3				3	1,2			2	3				3	3	40
23	8		1					2			2				2	1 to 4				4	4	40

24		1						1			1	1			2	2,3				3	3	20
25	8		1			2		3			3		1,3		2	2,4				4	4	25
26	4½	1						1		2	2	1	3,4		2	2				4	4	28
27	6	1						1			1	1	2,5		1	3,4				5	5	18
28	5					1		2	3		3		1		3	2,3,4				4	4	40
29	7	1			1			2	3		3	1	2,3		3	3,4				4	4	30
30	8		1		2			3			3	1,2			2	2,3,4				4	4	25
31	8							1			1		1,3		3	2,4,5				5	5	50
32	7					2		1,3,4			4		1,3		4	2,3,4				4	4	33
33	6				1			2			2	1	2,3,4		2					4	4	20
34	6		2					1			2			1,3	2	2,4			2	2	4	20
35	6				2		3	1			3	1	3,4		2	2,5				5	5	35
36	6				1			2			2			1,2		3,4			2	2	4	40
37	5	1						1	2		2	1	4	3	2	2,5			1	4	5	18
38	7				1			2			2	1	1,3		3	2,4				4	4	50
Farms using, per cent		36.8	26.3	13.2	34.2	18.4	18.4	86.9	7.9	18.4		52.6	71.1	13.2	81.6	81.6	7.9	2.6	13.1			
Average	7.0										2.3									4.2	4.3	33

[a] Spike-tooth harrow.

Cantaloupes are largely grown, and at the last cultivation cowpeas are sown broadcast over the entire field, furnishing shade for the ripening melons. Later, crab-grass comes up among the pea vines, and the mixture makes excellent hay. Practically no fruit is grown and only enough truck crops other than cantaloupes are grown to supply local demands.

Most of the cultivated land is in intertilled crops, labor being plentiful during the cultivation period. The cultivating is done with 1-horse implements (Table XXII). This is because more labor is available than is necessary during the cultivating season, in order that there may be enough available for picking cotton in the fall.

Some time during the winter or spring the cotton and corn stalks are chopped up with a stalk cutter or disk harrow.

Practically all the corn land is broken in the spring, mostly with a 2-horse plow. A few farmers practice breaking in the fall with a 2-horse plow and then rebreak in the spring with a 1-horse plow. It is a common practice to break the land for corn by throwing it up in beds the width the corn rows are to be apart. Occasionally land is broken level and then bedded. After bedding, no further preparation is given until planting time, and for preparation and planting a modified form of the Williamson plan is used. The corn is planted in the water furrow between the beds, but before planting a 1-horse subsoiling plow is run in the bottom of this water furrow, breaking the subsoil to a depth of 6 or 8 inches, and the corn is planted in this furrow by hand or with a 1-horse planter. The planting is always in drills about $5\frac{1}{2}$ feet apart, with hills $1\frac{1}{2}$ feet apart in the drill and one or two stalks to the hill.

Most of the farmers employ a modified form of the Williamson plan of cultivation. After planting, the corn is allowed to stand for three or four weeks before the first cultivation is given, in order to stunt the growth of the young plants. This is supposed to give a larger production of grain with a smaller stalk growth. To further this process no fertilizer is applied at planting time, but after the first cultivation some is applied at each cultivation, and during the season 500 to 700 pounds per acre are applied.

For the first cultivation one furrow is run on either side of the row very close to the corn, with a 4-inch 1-shovel plow going as deep as one mule can pull it. The middle is not plowed out at this cultivation.

Usually for the second cultivation a furrow is opened with a lister directly between the rows; then with a 1-horse turning plow all the middle is plowed out, throwing the dirt to this furrow and away from the corn. This usually takes six furrows with the turning plow.

For the next cultivation the middle is plowed out with the turning plow or sweep, throwing dirt to the corn. After this, practically all

the cultivating is done with sweeps covering all the middle with three furrows, and by the last cultivation the land is comparatively level.

As shown in Table XXII, often two or more implements are used for the same cultivation. Fertilizer is frequently applied to corn at the second or third cultivation, in which case the fertilizer distributor (fig. 35) is run close to the corn row and the middle plowed out with the sweep or 1-horse turning plow.

Very little stable manure is produced. Practically no cover crops are grown, but at the last cultivation cowpeas are often sown broadcast between the corn rows. Frequently peanuts are planted in drills between the corn rows at the last cultivation, and after the corn is gathered the field is pastured with hogs. Most of the corn is of the white dent varieties.

The most prevalent weeds are crab-grass, cocklebur, and smartweed.

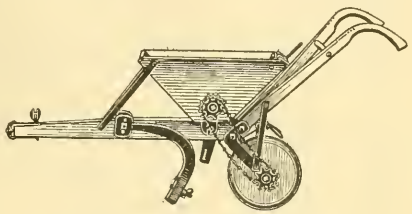

FIG. 35.—A fertilizer distributor.

SURVEYS IN AUGUSTA COUNTY, VA.

Augusta County is located in the Shenandoah Valley, Va., and the soil is of the Hagerstown series. This region is extremely rolling and in some places rocky, but the farms are divided into large fields, and improved machinery is generally used. (Table XXIII.) The work is mostly done with 2 and 3 horse teams. Except for a few bottoms none of the land is tile drained, but practically all the land is drained by surface ditches to prevent erosion.

Most of the leading roads have been macadamized and are operated under the toll system. The farms are usually operated by the owners with hired labor instead of tenants. The farms are large, and the people generally are in comfortable circumstances.

On most farms a rotation of corn one year, wheat two years, and hay two years is maintained. A large percentage of the land is in pasture, and apples are extensively grown. The farm income is principally from apples and grain, supplemented by hay and cattle.

The corn is grown on pasture or hay sod, and most farmers prefer to plow this land in the spring. Usually the breaking is done level with a 2-horse or 3-horse plow. After breaking, the land is harrowed once or twice with a spring-tooth or disk harrow, and before planting it is gone over with a spike-tooth harrow or roller. The planting is largely done with 2-horse 2-row planters. Corn is usually planted level and in drills 3½ feet apart, with one stalk every 18 inches in the drill. Where the land is not too rolling, the corn is planted in checks 3½ feet apart each way, with two stalks to the hill.

TABLE XXIII.—*Tillage practices with corn in Augusta County, Va., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 7 and 9 to 14 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.						Tillage after planting.										Normal yield per acre (bushels).
		Harrow.							Cultivator.					Total cultivations.				
									1-horse.		2-horse.							
		Spring-tooth.	Disk.	Spike-tooth.	Roller.	Log drag.	All workings.	Spike-tooth harrow.	3-shovel.	2-shovel.	6-shovel.	8-shovel.	10-shovel spring-tooth.	Harrow, weeder, or roller.	Other implements.	All workings.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		18
1	9	1,2,3					3				1 to 4				4	4		40
2	7	1,2		3			3				1,2,3				3	3		35
3	8	1,2		3			3				1 to 4				4	4		35
4	6	1,2	3		4,5		5				1 to 5				5	5		25
5	10	3	1,2				3				1,2				2	2		40
6	9		1				1				1,2,3				3	3		40
7	8	1,3		2			3		1,2,3						3	3		25
8	6	2,3,4	1				4	1			2,3,4			1	3	4		18
9	9	3	1,2		4		4	1,2				3 to 7		2	5	7		50
10	7	1,2,3					3				1 to 4				4	4		12½
11	9		1	2	3		3	1			2 to 5			1	4	5		50
12	8	1		2			2	1	2		3,4,5			1	4	5		25
13	8		1	2			2	1,2			3 to 6			2	4	6		30
14	8	1	2,4			3	4			1,2	3				3	3		30
15	8	3	1,2				3	1				2,3,4		1	3	4		20
16	9	1	2				2				1,2,3				3	3		37
17	8	1					1	1			2,3,4			1	3	4		40
18	8	3	1			2	3			1,2					2	2		40
19	8	1 to 4					4		1 to 5						5	5		16
20	9	3	1,2				3				1 to 4				4	4		40
21	7	2,3	1		4		4				1 to 5				5	5		35
22	10	2,3	1				3	a 1,2			3 to 6			2	4	6		50
23	5	1	2	3			3	1	4		2,3			1	3	4		50
24	7		1				1						1 to 4		4	4		30
25	8	3	1		2		3	1			2 to 6			1	5	6		20
26	8	1,2,3					3				1 to 4				4	4		30
27	9	1 to 4					4			4	1,2,3				4	4		20
28	9	1,2		3			3				1,2,3				3	3		50
Farms using...per cent		85.5	60.7	28.6	17.8	7.1		35.7	14.3	10.7	78.5	7.1	3.6	35.7				
Average.	8						3.0								3.7	4.1		33.0

a Roller.

After the corn is up, about one-third of the farmers use a spike-tooth harrow for the first cultivation. After this, most of the cultivating is done with a 2-horse 6-shovel cultivator. Usually three or four cultivations are given with this implement. Other cultivators found less frequently are the 2-horse 8-shovel, 1-horse 3-shovel, 1-horse 2-shovel, and 2-horse spring-tooth. Most of the farmers go over the field at least once with a hoe to chop out weeds and to replant.

Scarcely any cover crops are grown, and wheat is usually sown after corn. The yellow dent varieties of corn are largely grown.

The most prevalent weeds are foxtail, lamb's-quarters, chicory, and Spanish needle.

Considerable fertilizer is used for corn and wheat, and stable manure is applied broadcast to the sod land before planting to corn.

SURVEYS IN WAUSHARA COUNTY, WIS.

The tillage records for Wisconsin (Table XXIV) were taken in northwestern Waushara County, principally around Plainfield.

TABLE XXIV.—*Tillage practices with corn in Waushara County, Wis., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3, 4, and 6 to 11 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.			Tillage after planting.									Normal yield per acre.[a]
		Harrow.		All workings.	Spike-tooth harrow.	Weeder.	Cultivator.				Total cultivations.			
							2-horse.			1-horse 5-shovel, once to row.	Harrow, weeder, or roller.	Other implements.	All workings.	
		Disk.	Spike-tooth.				6-shovel.	8-shovel.	10-shovel spring-tooth.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	5	.....	1	1	1	.....	2,3,4	.....	.....	....	1	3	4	35
2	4	1	2	2	1	.....	2 to 5	.....	.....	....	1	4	5	30
3	5	1	2	2	1	2,4	.....	.....	3,5,6	....	3	3	6	50
4	6	1	2	2	1	.....	4,5	2,3	.....	....	1	4	5	25
5	6	1,2	3	3	1,2	4	3,5	.....	.....	6	3	3	6	T 8
6	6	1	2	2	1	3	2,4,5	.....	.....	....	2	3	5	30
7	6	1	2	2	1,2	3,5	4,6,7,8	.....	.....	....	4	4	8	25
8	6	1	2	2	1,2	.....	3 to 6	.....	.....	....	2	4	6	30
9	6	1	2	2	1	2	3,4	.....	.....	5	2	3	5	20
10	5	.....	1,2	2	1	.....	3,4	.....	.....	2	1	3	4	25
11	6	.....	1	1	1	3,5	2,4,6	.....	.....	....	3	3	6	25
12	6	.....	1,2	2	1	2	3,4,5	.....	.....	....	2	3	5	.....
13	5	1	2	2	1	3	2,4,5	.....	.....	....	2	3	5	30
14	5	.....	1	1	1,2	.....	3,4,5	.....	.....	....	2	3	5	35
15	6	1	2	2	1	.....	2,3,4	.....	.....	....	1	3	4	30
16	6	.....	1,2	2	1	2,3,4	5,6,7	.....	.....	....	4	3	7	45
17	5	1	2	2	1,2	.....	.....	3,4,5	.....	6	2	4	6	25
18	6	.....	1	1	.....	2,4	1,3	.....	.....	....	2	2	4	20
19	6	.....	1	1	1	.....	2 to 5	.....	.....	....	1	4	5	35
20	6	1	2	2	1	3,5	2,4,6,7	.....	.....	....	3	4	7	25
21	5	1	2	2	1	2	3 to 6	.....	.....	....	2	4	6	40
22	5½	1	2	2	1	.....	2 to 5	.....	.....	....	1	4	5	35
23	4	1	2	2	1	.....	2,3,4	.....	.....	....	1	3	4	25
24	6	1	2	2	2	.....	1,3,4,5	.....	.....	....	1	4	5	35
25	5	1	2	2	1	3	2,4,5	.....	.....	....	2	3	5	.....
26	6	1	2	2	1	2,4	3,5,6,7	.....	.....	....	3	4	7	25
Farms using..per cent	....	69.2	100	....	96.2	53.8	92.3	7.7	3.8	15.4	100	....	....	.....
Average	5½	.....	.....	1.8	.....	.....	.....	.....	.....	....	....	3.4	5.4	30.4

[a] Yields are given in bushels except on farm 5, where "T" means tons of ensilage.

This is primarily a potato-growing section, with a sandy or sandy-loam soil 8 to 12 inches deep, underlain with a heavier sandy-loam subsoil, which is often gravelly. This area is almost level, and since the soil is of a sandy character practically no drainage is required except on the low lands, where big drainage ditches are cut every mile or so.

The leading roads have been macadamized, and the country is fairly prosperous. Practically all the farms are worked by their owners, with some hired labor for harvesting crops. The farms range from 150 to 200 acres in size, with 125 to 150 acres tillable, but a considerable part of this area is usually in pasture.

As a general rule no definite rotations are practiced, but usually potatoes are planted on sod land, and corn is either grown on sod land or follows potatoes. Corn is followed by rye or oats, and potatoes, when not followed by corn, are followed with rye or oats. Timothy and clover is often sown with rye and oats. This crop is cut for hay the first year and allowed to stand another year for pasture. Hardly enough fruit or truck is grown to supply home demands, but the muck areas are well adapted to trucking, and cranberries are grown in favorable sections.

The principal sources of income are from potatoes and grain. Enough dairy farms are maintained to supply local demands, and enough hogs are produced to supply meat for the local markets.

The tillage methods are exceptionally uniform in this region. About half the corn land is broken in the fall and half in the spring with 2-horse and 3-horse plows. Then, before planting, the land is harrowed once with a disk and once with a spike-tooth harrow. Practically all the corn is planted level, and about half the planting is in checks 3½ feet apart each way, with two stalks to the hill. About one-half is planted in drills 3½ feet apart, with one stalk every 10 or 12 inches in the drill. Most of the planting is done with a 2-horse 2-row planter, but some farmers in checking plant by hand.

After planting, the field is gone over with a spike-tooth harrow once and with a weeder once. After this most of the cultivating is done with a 2-horse 6-shovel cultivator. The 2-horse 8-shovel, the 2-horse 10-shovel spring-tooth, and the 5-shovel 1-horse cultivators are used by a few farmers. After going over the field twice with the spike-tooth harrow or weeder, usually three cultivations are given.

Practically no cover crops are grown. No commercial fertilizer is used. Stable manure is usually applied to the sod land before breaking for potatoes.

The early white dent varieties of corn are principally grown.

The most prevalent weeds are foxtail, wild buckwheat, ragweed, quack-grass, and pigweed.

SURVEYS IN BATES COUNTY, MO.

Bates County is in the extreme western tier of Missouri and fairly well represents conditions as found in the corn belt of western Missouri and eastern Kansas. It is a typical prairie region, with a clay-loam soil underlain with a heavier loamy clay subsoil. The land is gently rolling, and no drainage is required. The soils of this county are very fertile, and the limiting factor in crop production is the amount of rainfall.

This region is fairly prosperous and has the general western spirit. Most of the leading roads have been improved. Good farmhouses and outbuildings are found, and the country appears prosperous to a greater extent than it really is. With good seasons the farmers get exceptionally good returns, but often the seasons are unfavorable.

About one-third of the farms in this county are operated by tenants, mostly for cash rent. The farms visited average 184.8 acres, with 146.8 acres under cultivation. A general rotation of corn two years, oats one year, wheat one year, and hay or pasture one or two years is practiced on most farms. Very little truck or fruit is grown, and wheat is the principal crop sold from the farms. Cattle and hogs are extensively raised, and practically all crops other than wheat are fed on the farm.

In preparing land for corn the pasture or hay sod is usually plowed in the fall with a 4-horse gang or a 3-horse sulky plow. In the spring this land is harrowed once each with a disk and spike-tooth harrow, and if cloddy it is often rolled (Table XXV). When corn follows corn the land is not broken until spring. It is first harrowed with a disk harrow, then plowed shallow (about 3 inches) with the 4-horse gang or 3-horse sulky plow and harrowed once or twice with the spike-tooth harrow. The corn is generally checked and planted level in rows $3\frac{1}{2}$ feet apart each way, alternating the hills with two and three grains. About three weeks after planting, the corn is harrowed with a 4-horse spike-tooth harrow. Some farmers harrow just as the corn comes up and again one week later.

Practically all the cultivating is done with 2-horse 6-shovel cultivators (3-inch shovels). Usually three or four cultivations are given in alternate directions. No cover crops are grown, but organic matter is supplied by stable manure and hay sod. No commercial fertilizer is used, but barnyard and stable manure is often applied broadcast to the corn land before planting. Both white and yellow dent varieties of corn are grown, but the white varieties predominate.

The most prevalent weeds are crab-grass, foxtail, bull nettle, cocklebur, smartweed, morning-glory, and pigweed.

TABLE XXV.—*Tillage practices with corn in Bates County, Mo., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 5 and 7 to 11 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.				Tillage after planting.								Normal yield per acre (bushels).
		Harrow.							2-horse cultivator.		Total cultivations.			
		Spike-tooth.	Disk.	Roller.	All workings.	Spike-tooth harrow.	Weeder.	Roller.	6-shovel.	4-shovel.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	5	1,2	.....	....	2	.....	....	1	2,3,4	.....	1	3	4	25
2	7	1,2	.....	....	2	1	....	....	2 to 5	.....	1	4	5	35
3	5	1,2	.....	....	2	.....	....	....	1,2,3	a 4	....	4	4	25
4	6	2	1	....	2	1	2	....	3 to 6	.....	2	4	6	25
5	6	1	.....	....	1	.....	....	....	1 to 4	.....	....	4	4	25
6	5	2	1	....	2	1,2	....	....	3 to 6	.....	2	4	6	12½
7	6	1,2	.....	3	3	1,2	....	....	3,4,5	.....	2	3	5	20
8	8	3,4	1,2	....	4	1	....	....	2 to 6	.....	1	5	6	40
9	6	1,2,3	.....	....	3	.....	....	....	1 to 4	.....	....	4	4	30
10	4	1,2	.....	....	2	1,2	....	....	3,4,5	.....	2	3	5	25
11	4½	2	1	3	3	1	....	....	2,3,4	.....	1	3	4	25
12	6	1,2	.....	3	3	1	....	....	2,3,4	.....	1	3	4	25
13	7½	2	1	....	2	1	....	....	2,3,4	.....	1	3	4	40
14	7	2	1	....	2	1,2	....	....	3	4,5,6	2	4	6	28
15	6	1,2	.....	....	2	1	....	....	2,3,4	.....	1	3	4	30
16	5	1	2	....	2	.....	....	....	1 to 5	.....	....	5	5	25
17	7	1,2	.....	....	2	1,2	....	....	3 to 6	.....	2	4	6	30
18	6	2	1	....	2	1	....	....	2 to 5	.....	1	4	5	30
19	6	3	1,2	....	3	.....	....	....	3,4	1,2	....	4	4	40
20	5	2	1	....	2	1	....	....	2 to 6	.....	1	5	6	35
21	6	2	1	....	2	1	....	....	.....	2 to 5	1	4	5	37
22	6	2	1	....	2	1	....	....	2,3,4	.....	1	3	4	35
23	6	3	1,2	....	3	1	....	....	2,3,4	.....	1	3	4	40
24	5	1,2	.....	....	2	1	....	....	2 to 5	.....	1	4	5	25
25	6	2	1	3	3	1,3	....	2	4,5,6	.....	3	3	6	25
Farms using.....per cent.	....	100	55	16	....	76	4	8	96	16	80	....	....	.....
Average	5.9	.....	.....	....	2.3	.....	....	....	.....	.....	....	3.7	4.8	29.3

a Disk cultivator.

SURVEYS IN ALEXANDER COUNTY, N. C.

The soil around Taylorsville, N. C., where the tillage records (Table XXVI) for Alexander County were taken, is mostly a red sandy clay loam with a very stiff red-clay subsoil. This region is very rolling and in some places the topsoil has been washed away until only the clay is left. No tiling is necessary here, but numerous surface ditches and terraces are required to control the surface water. Few of the country roads have been macadamized, and during unfavorable weather hauling is very difficult.

Less than half of the available land is under cultivation. The cultivated fields being small and irregular in shape, 1-horse cultivators are principally used. A general type of farming is practiced on most farms. Very little labor is hired, because most of the farms are worked by the owners.

TABLE XXVI.—*Tillage practices with corn in Alexander County, N. C., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 4, 5, and 7 to 11 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.				Tillage after planting.								Normal yield per acre (bushels).
		Rebroken with 1-horse plow.	Harrow.		All workings.	Spike-tooth harrow.	Cultivator.				Total cultivations.			
							1-horse.		2-horse.					
			Disk.	Spike-tooth.			4-shovel.	2-shovel.	8-shovel.	6-shovel.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	8	1	.....	1	1	1 to 4	5 to 8	.....	.....	.....	4	4	8	28
2	8	1	.....	1	1	1,2,3	4 to 7	.....	.....	.....	3	4	7	15
3	7	.....	.....	1,2	2	.....	1 to 4	.....	.....	.....	.....	4	4	25
4	6	1	.....	1	1	1	2 to 5	.....	.....	.....	1	4	5	20
5	5	.....	1	2	2	.....	.....	1,2,3	.....	.....	.....	3	3	25
6	7	1	.....	.....	0	1	2 to 5	.....	.....	.....	1	4	5	15
7	5	.....	.....	1,2	2	1,2	.....	3 to 8	.....	.....	2	6	8	50
8	6	.....	.....	1,2	2	.....	1,3,4	2	.....	.....	.....	4	4	20
9	8	1	.....	.....	0	1,2	.....	.....	.....	3 to 6	2	4	6	55
10	6	.....	.....	.....	0	.....	1,2,3	.....	.....	.....	.....	3	3	20
11	6	.....	.....	1	1	.....	.....	.....	1 to 4	.....	.....	4	4	20
12	5½	.....	.....	1	1	.....	1,3,4	2	.....	.....	.....	4	4	15
13	5	.....	.....	1	1	.....	1,3,4	2	.....	.....	.....	4	4	15
14	8	.....	1	2	2	a 1	2 to 6	.....	.....	.....	1	5	6	30
Farms using, per cent.	.....	35.7	14.3	78.6	.....	50.0	71.4	35.7	7.1	7.1	50.0	.....	.....	.....
Average	6	.....	.....	.....	1.1	.....	.....	.....	.....	.....	.....	4.1	5.1	25.2

[a] Weeder.

This land when properly treated is very productive, but when organic matter is not supplied the crop yields are low. No set rotations are followed, but an intertilled crop is usually followed by small grain, and the small-grain crops are followed by corn or cotton. Tobacco is grown on a few farms, but not so extensively as it was a few years ago. The leading money crop is cotton. Enough corn, wheat, and oats are grown for home use, and some wheat is sold. Considerable rye is grown for grain and also for green feed in the early spring. Very little fruit or truck is grown except for local demands, and few cattle or hogs are kept.

In preparing land for corn, about half the plowing is done in the fall with a 2-horse plow. In the spring, before planting, this fall-plowed land is rebroken with a 1-horse plow and the rest is broken with the 2-horse plow. After plowing, very little preparation is given before planting. Usually the land is harrowed once or twice with a spike-tooth harrow. A few farmers use a disk harrow. The corn is planted level and in drills 4 feet apart, with one stalk every 2 feet in the drill. Most of the planting is done by hand. A few farmers use a 1-horse planter.

When the corn is up the field is usually harrowed once or twice with a spike-tooth harrow. After this most of the cultivating is done with a 1-horse 4-shovel cultivator. The 1-horse 2-shovel cultivators are frequently used and occasionally 2-horse 6 and 8 shovel cultivators are found. Four or five workings are usually given.

Considerable hand labor is used in chopping out weeds and replanting. Practically all the corn grown is of the white dent varieties. A few farmers grow crimson clover as a winter cover crop with good results.

Commercial fertilizer is used only in small quantities and comparatively little stable manure is produced. The most prevalent weeds are crab-grass, sheep sorrel, Spanish needle, cocklebur, and ragweed.

SURVEYS IN OKLAHOMA COUNTY, OKLA.

The tillage records for Oklahoma (Table XXVII) were taken in the prairie section of northwestern Oklahoma County, just west of Edmond.

The county is divided into sections, and practically every section line is a public road. Through the prairie section these roads are in fair condition all the year except during very wet weather.

Most of the farms are worked by the owners. As a rule the farmers have exceptionally good houses and outbuildings.

The soil consists of a dark silt loam 10 to 20 inches deep, which grades into a heavier silty clay subsoil. The subsoil is almost impervious and affords poor drainage conditions. It is hard for the crop roots to penetrate this subsoil, and the crops suffer badly during either wet or dry weather. The country is rolling enough to afford good natural drainage, but not steep enough to interfere with the use of improved machinery. There is very little timber in this section, and practically all the land is in cultivation or grass. The farms are divided into large uniform fields of convenient shape.

This is a comparatively new section, and the settlers came from all parts of the country and brought with them the methods which were employed in the locality from which they came, so the systems followed are not uniform.

Very little fruit or truck is grown. A large part of the land is in pasture, and cattle and hogs are extensively raised. No set rotations are practiced. The principal crops grown are corn, wheat, oats, cotton, alfalfa, kafir, and milo. Unless seasons are very favorable cotton does not yield well, but it is one of the principal money crops. Alfalfa is grown mostly on the bottom lands near streams. A few farmers are growing it with success by irrigation. This crop is often utilized in hog pastures.

TABLE XXVII.—*Tillage practices with corn in Oklahoma County, Okla., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 4 to 7 and 9 to 15 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.						Tillage after planting.									Normal yield per acre (bushels).
		Bedded as broken.	Harrow.		Rows run with lister.	Lister and planter combined.	All workings.	Spike-tooth harrow.	Cultivator.				1-horse 5-shovel.	Mowing-machine wheel.	Total cultivations.		
			Spike-tooth.	Disk.					2-horse.						Harrow, weeder, or roller.	Other implements.	All workings.
									Lister.	4-shovel.	6-shovel.	Disk.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1		1			1		1		1,2		3,4					4	4	20
2	4		1			2	2	1		2,3,4					1	3	4	10
3	6		1			2	2			3		1,2				3	3	10
4	5		1			2	2	1		2,3	4				1	3	4	12
5	6		1,2			3	3	1		2,3,4					1	3	4	20
6	6		1			2	2		1,2	3						3	3	15
7	4		1			2	2		1,2,3		4					4	4	30
8	5		1			2	2	1		2,3					1	2	3	30
9						1	1		1,2,3		4					4	4	35
10						1	1		1,2,3		4					4	4	20
11	5		1			2	2	1				2,3,4			1	3	4	16
12	6			1	2		2				1,2,3		4			4	4	10
13	6					1	1		1,2	3						3	3	25
14	7		1			2	2	3	1,2	4,5					1	4	5	30
15	6						0			1,2,3						3	3	25
16						1	1		1	2,3,4						4	4	
17							0			1,2,3						3	3	20
18	8	1	1			2	2		1,2	3			4			4	4	40
19	4				1		1	1		2,3					1	2	3	25
20							0	1,2		3,4					2	2	4	40
21	6		1	2			2	1			2,3,4		5	6,7	1	6	7	45
Farms using...per cent		9.5	52.4	9.5	14.3	66.7		42.8	42.8	66.7	33.3	14.3	9.5	4.8	42.9			
Average.	5.6						1.5									3.4	3.9	23.9

The methods of cultivating corn are quite variable, but in regard to crop yields, soil fertility and tillage methods are minor factors as compared to the amount of rainfall during the growing season. A few farmers plow the corn land in the fall and then rebreak in the spring just before planting. The common practice is to break the land level, harrow with a spike-tooth harrow, and lay off the rows with a double moldboard plow commonly known as a lister or middle buster, which plows out a broad, deep furrow, throwing the dirt to either side. The corn is planted in the bottom of this furrow.

Most farmers use the combination planter and lister, which is the shovel plow and planter combined. This implement plows out the furrow and plants the corn at one operation. Frequently corn is planted with this implement without any previous preparation of

the land. Especially is this true when corn follows corn or cotton. For such work a 3-horse or 4-horse team is used and the plow employed has a broad shovel which breaks practically all the row. No difference in the yield is noted from the different methods of preparing the land. About 90 per cent of the corn is listed and planted in drills 3 to 3½ feet apart with one stalk every 18 inches in the drill.

After planting, a spike-tooth harrow is frequently used just as the corn comes up. A disk cultivator especially designed for cultivating listed corn is extensively used for the first cultivation. The 1-row cultivator of this type (fig. 36) is constructed on a sled which straddles the corn row and protects the corn plants from being covered with dirt from the disk cultivators which run on either side of the row. The 2-horse 4 and 6 shovel cultivators and disk cultivators are used for the later cultivations. A few farms use a 1-horse 5-shovel cultivator. Usually three or four cultivations are given. After the corn gets too high to cultivate, some farmers will, with one horse, drag a mowing-machine wheel between the rows, which destroys nearly all the small weeds and forms a shallow dust mulch.

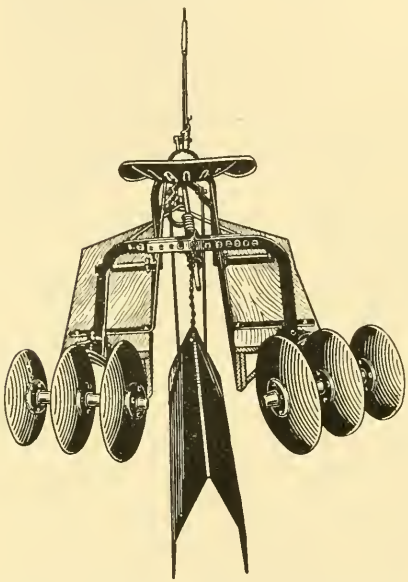

FIG. 36.—A type of 2-horse disk cultivator used in Oklahoma and western Kansas for cultivating listed corn.

Practically no cover crops are grown and no commercial fertilizer is used.

The yellow dent varieties of corn are principally grown.

The most prevalent weeds are smartweed, crab-grass, ragweed, bull nettle, artichoke, and Johnson grass.

SURVEYS IN PIKE COUNTY, ALA.

The tillage records for Alabama (Table XXVIII) were taken in Pike County near Troy. The soil in this region is of a sandy or sandy-loam type, usually dark red in color, and underlain with a reddish sand-clay subsoil. The land is very irregular and in some places extremely rolling. Drainage is principally obtained by means of numerous terraces, which divide the fields into small, irregular-shaped areas. These terraces are usually about 25 yards apart and are so constructed that they can not be worked over. On most of them Bermuda grass is grown to prevent erosion.

TABLE XXVIII.—*Tillage practices with corn in Pike County, Ala., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 4, 5, and 7 to 11 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.				Tillage after planting.								Normal yield per acre (bushels).
		Bedded as broken.	Rows run with—		All workings.	1-horse plow.		Cultivator.		1-horse sweep.	Total cultivations.			
			Lister.	Bull-tongue plow.		Turning.	1-shovel.	1-horse spike-tooth.	2-horse 1-row disk.		Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	10	1	1	....	1	2	1	.....	.....	3	....	3	3	30
2	7	1	....	1	1	.....	2	1	.....	3,4,5	....	5	5	25
3	6	....	1	2	2	.....	.....	1,4,6	.....	2,3,5	....	6	6	25
4	10	1	....	....	....	1,4	2,3	.....	.....	3,5	....	5	5	18
5	10	1	....	....	....	3	2	1	.....	4	....	4	4	33
6	10	....	1	....	1	1,4	2	.....	.....	3,5	....	5	5	40
7	6	1	....	....	....	2,4	1	.....	.....	3,5	....	5	5	20
8	9	1	1	....	1	1,2,3,5	.....	.....	.....	4,6,7	....	7	7	20
9	6	1	....	....	....	2,4	1	.....	.....	3,5	....	5	5	20
10	10	1	....	....	....	1	.....	.....	.....	2,3,4	....	4	4	12
11	5	1	....	....	....	.....	.....	1,2,3	.....	4	....	4	4	20
12	4	1	....	1	1	1	2	.....	.....	3,4	....	4	4	15
13	5	1	....	....	....	1,3	.....	.....	.....	2	....	3	3	20
14	8	....	1	....	1	1,3	.....	.....	.....	2,4	....	4	4	.....
15	6	....	1	....	1	4	.....	1	2	3,5	....	5	5	18
16	7	1	1	....	1	2,4	.....	1	.....	3,5,6	....	6	6	.....
17	4½	1	....	....	....	1,3	.....	4	.....	2	....	4	4	.....
18	3	1	....	....	....	1,3	.....	.....	.....	2,4	....	4	4	.....
19	5	1	....	....	....	2,4	1	.....	.....	3,5,6	....	6	6	.....
20	5	1	....	1	1	2,3	4	1	.....	5	....	5	5	31
21	4	1	....	1	1	1,3	.....	.....	.....	2,4	....	4	4	.....
Farms using.....per cent.	....	80.9	33.3	23.8	....	85.7	47.6	38.1	4.8	100	0	....	....	.....
Average	6.7	....	....	....	0.6	.....	.....	.....	.....	.....	....	4.7	4.7	23.1

Only a few of the leading roads have been macadamized, and during wet weather hauling is difficult. Owing to the mild winters and the scarcity of cattle, very cheap barns and outbuildings are found on most farms. Because of so many cheap tenant houses and the lack of good outbuildings, the country does not look prosperous, but the landowners have good dwelling houses and appear well to do.

Some of the farms are operated by the owners with hired labor, but most of the farming is by the tenant system, in which the landlord furnishes all supplies and supervises the work. The land is often owned in large tracts and operated by a number of tenants, each tenant cultivating about 25 acres.

No general rotation is practiced. The principal crops are corn and cotton, with about two-thirds of the land in cotton. Some oats are grown on most farms. In the southwestern part of the county, considerable sugar cane is grown. Peanuts and velvet beans are

planted between the corn rows at the last cultivation. These are either harvested or pastured by cattle and hogs after the corn is gathered. By this means a few cattle and hogs are grown. A good part of the land is pasture, but the native grasses afford poor grazing. Little fruit or truck is grown, and the farm income is principally from cotton.

Under the tenant system here each tenant is usually given one mule and as much land as this mule can cultivate, so that practically all the cultivation is with 1-horse implements. In breaking the land for corn, sometimes an extra mule is furnished and the land is broken with a 2-horse plow, but the general practice is to break the land with a 1-horse plow, and instead of flat breaking it is thrown into ridges or beds the width apart the corn rows are to be. Sometimes a narrow strip of land is left between these ridges. This strip is plowed out with a 1-shovel plow (fig. 37) running very deep, and the corn is then planted in the furrow.

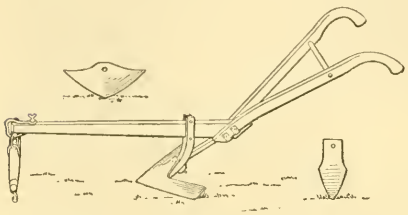

FIG. 37.—A 1-horse 1-shovel plow with cotton sweep attached, used to cultivate corn in the Southern States. At the top is a broad shovel or solid sweep; below, a narrow shovel, used in making furrows for planting.

A few farmers break the land level and then lay off the rows with a double moldboard plow known as a lister, or middle buster, which throws the dirt to each side and leaves a broad, deep furrow. The corn is planted in the bottom of this furrow. After plowing, the land is usually given no further preparation before planting.

The corn is planted in drills from 5 to 6 feet apart, with one or two stalks every 2 feet in the drill, and either between beds or in the bottom of a furrow. After the corn is up, a 1-horse spike-tooth cultivator (fig. 38) is often used for the first cultivation, but more often a 1-horse turning plow or a 1-horse 1-shovel plow, known as a bull tongue, is used. One furrow is run on either side of the row, throwing the dirt toward the middle of the row and away from the corn, leaving the corn on a narrow ridge. Later, the middle is plowed out with the turning plow, throwing the dirt toward the corn. This cultivation tears down the ridge and leaves the land almost level. After this, the cultivating is done with broad sweeps covering all the middle with three or four

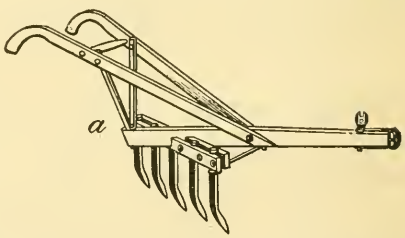

FIG. 38.—A 1-horse spike-tooth cultivator, or side harrow, used in the rolling areas of Alabama and Mississippi.

furrows. Three to six cultivations are usually given, depending on the amount of rainfall and the weed growth. The white dent varieties of corn are almost exclusively grown.

Commercial fertilizer is extensively used for all crops, but little stable manure is produced. Practically no cover crops are grown, but winter weeds, principally life everlasting (cudweed), often make considerable growth during the fall and winter months, which make winter cover crops not so necessary.

The most prevalent weeds are life everlasting, Johnson grass, purslane, cocklebur, and crab-grass.

SURVEYS IN HOLMES COUNTY, MISS.

The tillage records for Mississippi (Table XXIX) were taken in Holmes County, mostly around Lexington. The upland soils are of a silt-loam type, dark yellow in color, and from 6 to 10 inches deep. The subsoil is of a heavier silt loam, containing more clay and darker in color. Along the streams the bottom lands are much heavier and more level land is found, but the uplands are very rolling and erode easily. Practically none of the land is tile drained and very few surface ditches are found. Only about one-half the land is cultivated, and after a field has been depleted of its fertility by continuous cropping and erosion it is abandoned and other land cleared.

Only a few of the roads have been macadamized, and hauling is very difficult during bad weather. The land is mostly owned in large tracts or plantations and is worked by negro tenants under the supervision of the owner. The landowners have good houses and appear prosperous, but the tenant houses and the lack of good outbuildings detract from the prosperous appearance of the country.

The principal crops grown are corn and cotton, with some oats for hay. In the southwestern part of the county sugar cane is extensively grown. Truck crops, especially strawberries and cabbage, are much grown in the eastern part of the county and shipped to the Chicago market. Near Lexington very little truck or fruit is grown. Considerable land is in native grass, which furnishes pasture for a good part of the year, and a few cattle and hogs are kept. It is a common practice to sow cowpeas broadcast between the corn rows at the last cultivation and after the corn is gathered pasture them off with cattle and hogs. The principal money crop is cotton, but since the boll weevil has reached this section more corn and less cotton are grown. No rotations are practiced, and the land is usually kept in corn or cotton until the crop yields become so low that its cultivation is not profitable.

TABLE XXIX.—*Tillage practice with corn in Holmes County, Miss., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 4 to 10 and 12 to 20 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after plowing and before planting.									Tillage after planting.											Normal yield per acre (bushels).
		Bedded as broken.	Harrow.			Plank drag.	Bedded with 1-horse turning plow.	Rows run with—		All workings.	Harrow.		1-horse plow.				1-horse sweep.	Cultivator.		Total cultivations.			
			Spike-tooth.	Disk.	Acme.			Lister.	Bull-tongue plow.		Spike-tooth.	Disk.	1-shovel.		2-shovel.	Turning.		1-horse spike-tooth.	2-horse 8-shovel.	Harrow, weeder, or roller.	Other implements.	All workings.	
													Narrow.	Broad.								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	5	1		1						1		1,2					3	4		2	2	4	45
2	4	1		1			2			2		1					2,3	4		1	3	4	36
3	4			1			3		2	3			2			3	1,4				4	4	40
4	6	1								0			2			1,4	3				4	4	25
5	5	1								0				1		4	2,3				4	4	20
6	4	1		1						1			2			1,4	3,5	6			6	6	25
7	4	1	1							1						4	1,2	3			4	4	10
8	6		2				1			2			2	3		1	4 to 7				7	7	20
9	5								1	1			2			3	1				3	3	20
10	4	1	1							1						2	1,4,5	3			5	5	20
11	8			1				2		2	1,2						3,4,5			2	3	5	30
12	3½	1	2				1			2			1			3	2				3	3	18
13	8		1				2			2						3	1,2	4			4	4	15
14	8				1	2		3		3	a1						2	3,4,5		1	4	5	20
15	4	1								0						4	1,2,3	5			5	5	10
16	8	1								0	1				2		3,4			1	3	4	20
17	4	1								0	1					4	2,3	5		1	4	5	20
18	6		2				1			2	1,2		3						4,5	2	3	5	20
19	6	1	1						2	2						4	1,3	2,5			5	5	9
20	4	1	1							1						3	1,2,4	5			5	5	18
21		1	1						2	2						4	1,3,5,6	2			6	6	20
22	4	1	1							1							1	2,3,4			4	4	20
23	4	1	1						2	2			2			3,7	1,4,5	6			7	7	25
24	4	1	2				1			2			2	3		5	1	4			5	5	15
25	4	1	1							1						1,2,5	3	4			5	5	30
Farms using....per cent		72	52	20	4	4	28	8	20		20	8	36	12	4	72	96	64	4	28			
Average	5.1									1.4											4.3	4.7	22

a Weeder.

On account of the tenant system employed and the rolling condition of the land, most of the cultivating is done with 1-horse implements. In preparing the land for corn, a disk harrow is often run over the field some time during the winter to chop up the old cotton or corn stalks. Most of the breaking is done in the spring, but a few farmers break the land in the fall and then rebreak in the spring. Instead of "flat breaking," practically all the land as broken is made into beds or ridges the width apart the corn rows are to be. A good part of this breaking is done with 1-horse plows, but during the last few years 2-horse plows have come into more general use and the land is broken deeper than formerly. After breaking, these ridges are usually harrowed down almost level with a spike-tooth or disk harrow before planting. Often a bull tongue or subsoil plow is used to run off the rows and a very deep furrow plowed out, in which the corn is planted. On the bottom lands the corn is planted on the beds, but on the uplands it is planted between the beds. Practically all the planting is in drills 3½ to 4 feet apart, with one stalk every 2 feet in the drill.

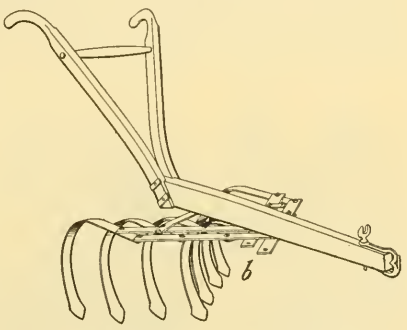

FIG. 39.—A spring-tooth 1-horse or "gee whiz" cultivator, used in parts of Alabama and Mississippi.

After planting, the methods of cultivating corn are not very uniform. Until recent years, the 1-horse turning plows and the cotton sweeps were practically the only cultivators used, but during the past few years more surface cultivation has been practiced. After the corn is up, a few farmers use a 2-horse harrow for the first cultivation, but more often 1-horse spring-tooth cultivators (fig. 39) are used, giving one or two furrows to the middle. The spike-tooth cultivator is used more generally than any other implement in this section. The 1-horse turning plows and the 1-horse 1-shovel plows are often used to plow down the middles and level up the rows. For the last cultivation a cotton sweep is often used. Very few 2-horse cultivators are found.

Practically no cover crops are grown, and very little commercial fertilizer is used. Very little stable manure is produced because the cattle stay in the field during most of the year.

The white dent varieties of corn are principally grown.

The most prevalent weeds are crab-grass, bindweed, Bermuda grass, Johnson grass, and cocklebur.

SURVEYS IN RUSSELL COUNTY, KANS.

Russell County is located in the central-western part of Kansas and is primarily a wheat-producing section. This is a typical prairie

region, of broad, gently sloping ridges and level valleys. No drainage is required. Some parts of this area are extremely rolling and rugged. These lands are used for grazing purposes.

The country has not yet been fully developed. Only a few of the principal roads have been improved. On account of the extra large size of the farms the country is thinly populated, which makes it impracticable to have schools and churches conveniently near. Practically no timber is grown and the farmhouses and barns are built of a convenient soft native stone, which hardens when exposed to the air. The absence of trees around the farm homes gives to the country a rather desolate appearance. All the farm lands are fenced, the fence posts being of stone.

TABLE XXX.—*Tillage practices with corn in Russell County, Kans., showing depth of plowing, implements used in order of use, number of times each is used, and normal yield of the crop.*

[In columns 3 to 8 the figures show the order in which the implement was used on the several farms; as, 1 = first working or cultivation, 2 = second working or cultivation, etc.]

Farm No.	Depth of plowing (inches).	Tillage after planting.[a]									Normal yield per acre (bushels).
				Cultivator.				Total cultivations.			
				Lister.		2-horse.					
		Spike-tooth harrow.	Plank drag.	2-horse.	4-horse 2-row.	4-shovel.	6-shovel.	Harrow, weeder, or roller.	Other implements.	All workings.	
1	2	3	4	5	6	7	8	9	10	11	12
1	3			1,2			3	0	3	3	10
2	6				1,2	3		0	3	3	31
3	5	2,4			1,3	5		2	3	5	20
4	8		2		1,3			1	2	3	10
5	6	1			2,3	4,5		1	4	5	20
6	6				1,2	3		0	3	3	10
7	6	1				2,3,4		1	3	4	25
8	6	2			1,3			1	2	3	15
9	6				1,2	3		0	3	3	25
10	6				1,2		3,4	0	4	4	25
11	5	2			1,3		4,5	1	4	5	20
12	3				1,2		3	0	3	3	20
13	5	1			2,3		4,5	1	4	5	20
14	7	1			2,3		4	1	3	4	20
15	5				1		2,3,4	0	4	4	20
16	5	2		1	3,4		5	1	4	5	25
17	6	2			1,3	4		1	3	4	25
18	4		2		1,3			1	2	3	18
19	4	1			2,3		4	1	3	4	30
20	5				1,2		3	0	3	3	20
21	5	1			2	3,4		1	3	4	20
22	6				1,2		3	0	3	3	20
23	6				1,2,3		4,5	0	5	5	20
24	7				1,2		3	0	3	3	20
25	7				1,2		3	0	3	3	20
Farms using...per cent		44	8	8	92	32	56	52			
Average	5½								3.2	3.8	20.4

[a] No tillage was given after plowing and before planting.

No general rotations are practiced. Wheat is the principal money crop, and on many farms it is the only crop grown. Corn, kafir, and

cane are grown only on the bottom lands. In collecting the data shown in Table XXX only those farms which grow corn were visited. Some alfalfa is grown on the bottom lands and in favorable seasons does well.

Most of the land is farmed by the owners, or the farmer may own a farm and rent other land in addition. The average size of the farms visited in this county is 655 acres, with 331 acres under cultivation. These farms are somewhat larger than the average for this region. The land in this section is very fertile and productive, and the limiting factor in crop yields is the amount of rainfall.

The bottom-land farmers, because they can grow forage crops, keep more cattle and swine than the upland farmers, and their sources of farm income are cattle, hogs, and wheat. For the upland farms the income is principally from wheat. Not enough fruit or truck is grown to supply home demands.

The tillage methods with corn here are exceptionally uniform and represent the methods employed throughout the semiarid region of western Kansas and western Nebraska. Corn usually follows corn or kafir. The land is generally harrowed in the spring with a disk harrow, and without plowing or further preparation corn is planted with a 4-horse combination lister and planter. This planter has a double moldboard and usually runs about 5 inches deep, throwing the dirt in both directions, and the corn is planted in the bottom of this furrow. The rows are usually 3½ feet apart, with one stalk every 18 or 20 inches in the drill. In opening up this furrow most of the land is broken, but there is a strip directly between the rows which is not plowed. This strip is broken up during the cultivation.

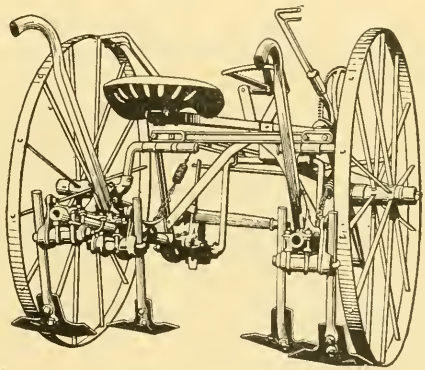

FIG. 40.—A 2-horse 4-shovel cultivator with sweeps attached instead of shovels. This implement is extensively used in cultivating corn in Texas and Oklahoma.

After the corn is up, the first cultivation is most often given with a 4-horse 2-row disk cultivator designed for cultivating listed corn. At this cultivation the dirt is thrown away from the corn and the ridges made higher. These ridges are next harrowed with a spike-tooth harrow or plank drag and partly torn down. The next cultivation is given with the same 4-horse 2-row cultivator, with the disks adjusted so as to throw dirt to the corn, tearing down the ridges between the rows. The next and last cultivation is usually given

with a 2-horse 4-shovel or 6-shovel cultivator (fig. 40), and this leaves the land about level.

No cover crops are grown and no commercial fertilizers used. Cattle spend most of their time in the pastures, so little manure is saved.

The yellow, white, and red varieties of dent corn are grown.

The principal weeds of this section are cocklebur, Russian thistle, pigweed, bindweed, sand bur, and sunflower.

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